The Electrical Review

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The National Viewpoint

IT has now become a trite saying that electricity is so vital to industry and social life generally that its development as a national service must take precedence of any parochial interests. But this does not take us very far. What do we mean by "national" and by "parochial," and how can this generally accepted principle be turned into practice without introducing more evils than those it destroys?

"National" does not mean "Government-owned" any more than "parochial" is equivalent to "municipal"; the Central Electricity Board is not a Government department and many municipalities have shown a far from parochial outlook in carrying out electrical distribution outside their borough boundaries.

Mr. H. Hooper, in his paper before the I.E.E. East Midland Sub-Centre, takes a wide survey of the electricity supply section of our industry, and like the chairman of the South Midland Centre two years ago, Mr. G. Rogers, expresses very definite views on its reorganisation.

He points out that the national point of view is now general with regard to the generation of electricity; in the even more important aspect of distribution—including sales and service—we are still handicapped in many areas by local limitations, mostly economic, due to sparsity of population, but partly owing to narrowness of outlook. This has long been apparent to members of our own industry; it is becoming increasingly obvious to those outside, and if we fail to put our own house in order the politician will sooner or later intervene.

Mr. Hooper's proposal that a National Electricity Board should be formed on the lines of the C.E.B., performing its present functions and those of the Electricity Commissioners as well as taking over all the supply undertakings would, if accepted, cut the Gordian knot.

As immediately practical politics—and it is with the immediate future that we must concern ourselves—the main objection to this scheme is that the contentious nature of the legislation involved would probably cause the Bill to be emasculated in the committee stage. The essential difference between such a measure and the 1926 Act is that the latter dealt with generation, which is merely incidental to the supply of electricity, and it was to supply electricity that the undertakings were given statutory powers. This difference is a radical one.

A quicker way to start upon co-ordination would be to work as far as possible within the compass of existing Acts and to confine attention for the moment to those undertakings that are for physical reasons unable to give adequate service. They could be required to group themselves into Joint Electricity Authorities and to submit to the Commissioners schemes for improving supplies, including proposals for uniform tariffs, voltage, and system.

While leaving operating matters to the constituent undertakings the Joint Authority would be responsible for development, constructional work, and the provision of adequate service. The first need is to bring the backward undertakings up to the level of the most progressive. And the need is pressing.

Electricity and the Builder

THE idea behind the Building Centre was explained in our issue of September 9 (p. 348), when we reproduced a number of photographs of the establishment. It is therefore sufficient to state briefly that it has been arranged by the building industry with the co-operation of its various branches. While it would not be true to say that the Centre is all-electric, the influence of the British Electrical Development Association has been brought to bear so strongly that electricity predominates in almost every department—most certainly as regards the lighting, which is of the most modern character. The gas industry is represented, of course, but it is a matter for the greatest satisfaction that, for once in a way, in an effort participated in by the two industries, electricity definitely has the upper hand. As we explained on

the earlier occasion, all kinds of domestic electrical apparatus has been installed in appropriate settings in which it is shown in action by capable demonstrators. Many of the leading electrical manufacturers have contributed to the display, which is thus representative of the best modern practice. For the architect's benefit methods of installation are exemplified, enabling him to prepare his designs with a full appreciation of the special needs of the medium, and, indeed, enabling him to produce definitely improved plans. The builder, too, is able to gain at the Centre an excellent idea of what is required of him in the erection of the modern electrically equipped house, and even the electrical contractor will derive profitable knowledge from a visit, a course which we heartily recommend.

Telephone Publicity

THE Post Office publicity methods have noticeably improved lately. Quite one of its best efforts to popularise the telephone is the well-produced and well-illustrated book entitled "Facilities for Telephones in New Buildings," which we saw at the Building Centre. It gives practical information and is obtainable gratis. We notice that it has been compiled with the help of the Royal Institute of British Architects, and so conclude that the necessity of making provision in the original building plans for telephones as well as for lighting and power circuits is appreciated by those who have it in their power considerably to reduce installation costs by the exercise of a little forethought.

"What are my Prospects?"

THE "rising generation" of electrical students, as well as many who have completed their course of training, are asking this very human question with a measure of anxiety. It is so in other lands besides Great Britain. Very appropriate was it therefore for Dr. Marchant to open the first informal meeting of the Institution of Electrical Engineers with his views on "The Future Prospect for the Electrical Engineer." Professionally he is responsible for the training of many young engineers, and may be credited with a sympathetic understanding of their concern. It is as well that all electrical men, whether they are beginners or whether they are in a job which offers little immediate encouragement, should be constantly reminded that they belong to an industry or a profession which unquestionably offers scope for unlimited development as the economic gloom passes. Dr. Marchant said, as we have so often stated here, that for the industry as a whole there is great promise, and he did not hesitate to use the words "enormous developments" in relation to what we are to expect in the next few years.

Prizes to be Won

NOT only is there to be large expenditure upon the grid developments in rural areas, but expansion of the telephone service is also inevitable. It is, indeed, like radio, one of the fields offering special opportunity in spite of all prevailing handicaps to business progress. But it is not in such directions alone that the young electrical man will find his chance. Those who can bring ingenuity to bear upon the cheapening of the cost of overhead connections from the grid to the distribution lines may carry off valuable rewards, while the design and production of cheaper and better domestic electrical apparatus to meet an ever-growing demand was instanced as another class of opening for those who wonder what chances the future holds for them to make a name, a position and competency.

The Grays of Silvertown

BY many of our readers the news of the death of Mr. Christian Hamilton Gray will be received with feelings of exceptional regret. In his passing we have lost the last of the six men to bear a name that has been great amongst us for more than half a century. Matthew Gray, so long an outstanding leader in submarine cable-laying expeditions and in cable manufacture, passed away thirty-one years ago, leaving five sons and one daughter. Four of the sons each in turn figured prominently in the management of the affairs of the company which Matthew Gray formed in conjunction with S. W. Silver, when in 1864 the India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd., acquired the business of Silver & Co., of Silvertown. "Silvergray," still the telegraphic address of the company, combines the names of the original founders—Silver and Gray. To speak of "the Grays of Silvertown" was a habit in the electrical industry forty years ago, and remains so to-day with some. Robert Kaye Gray, the eldest of the five sons occupied the presidential chair of the Institution of Electrical Engineers with great distinction. The cloak of managing director of the Silvertown Company fell upon him at the death of his father. From 1913 William E. Gray and Christian H. Gray, his brothers, followed in that office continuously until last year, when at the death of the former Mr. Christian Gray and Mr. W. F. Lloyd became managing directors.

Electro-Harmonic Concerts

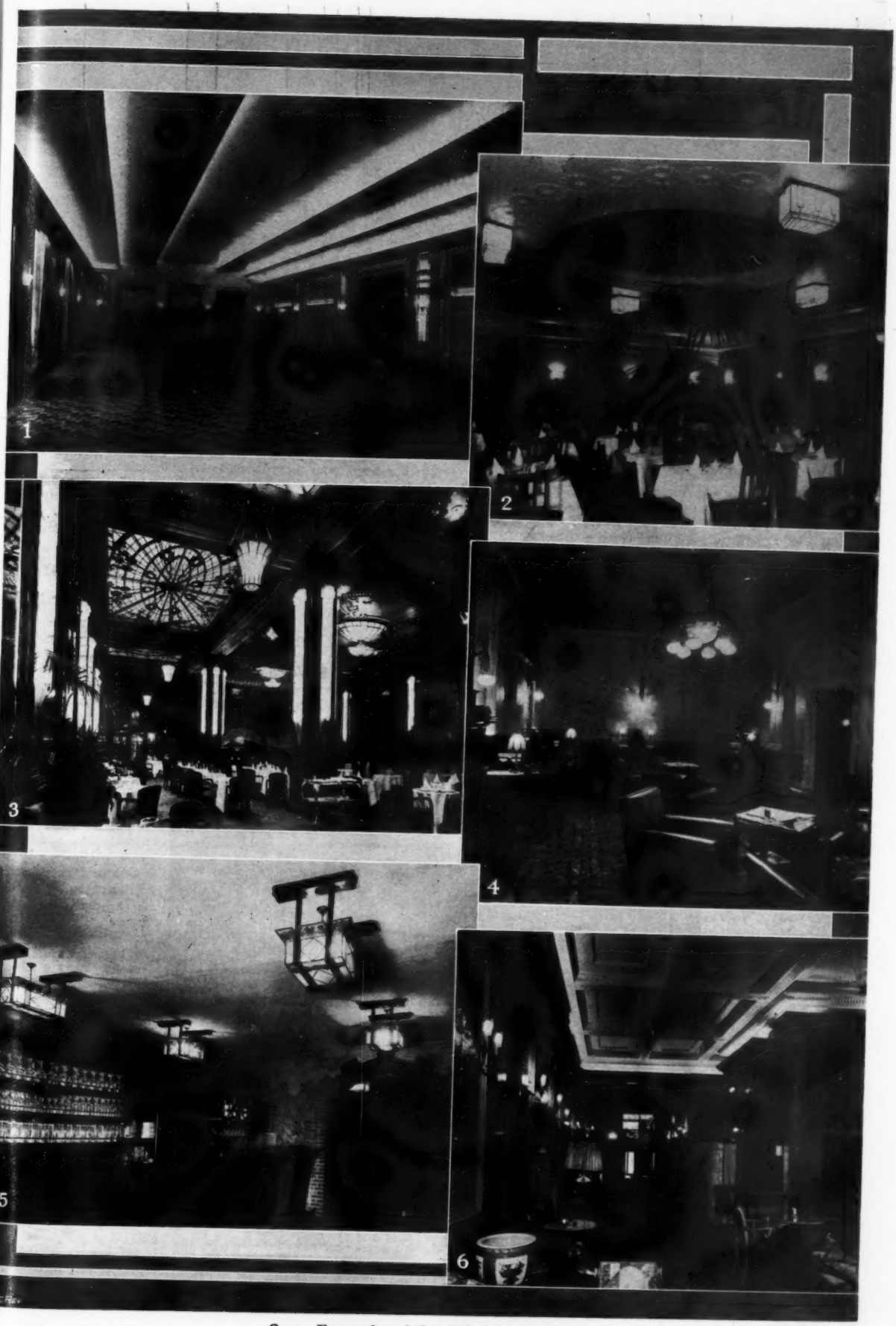
THE Electro-Harmonic Societies of Manchester and Liverpool have made a very good beginning with their concert arrangements for the 1932-33 season. The Manchester Society, which has now reached the mature age of fourteen years, opened its programme with a smoking concert at which some 200 members and friends were present. That it continues to flourish is a matter for congratulation. The Liverpool and District Society started off with a dinner and smoking concert last Friday (after a golf tournament two days earlier by way of a preliminary canter). Both Societies have arranged for separate monthly events from now on to March next, and in addition there will be inter-visits at which electrical and allied men from the two cities will happily fraternise. Both bodies open their doors wide to visitors from other parts of the country, as will be seen from the notes appearing on another page. What has London to offer in return? Does the original Electro-Harmonic Society, which flourished so long in London, continue in a state of suspended animation? Has the time arrived for either applying resuscitation measures or forming a new Society? The years that have elapsed since it "fell asleep" have wrought ravages with our electrical personnel, but time has also brought thousands more into the industry. It is perfectly true that there is something electrical on somewhere in London practically every night in the winter, but the old Electro-Harmonic fixtures provided a social rendezvous for everybody electrical. We fancy that something of the kind is wanted again. What do our readers think?

Patents and Impossibilities

SIR WILLIAM JARRATT, Comptroller-General of Patents, speaking at the dinner given to celebrate the jubilee of the formation of the Chartered Institute of Patent Agents, claimed that the Act which came into force last Tuesday would make our patent law equal to that of our most important competitors. An important new provision is that the search for novelty by the officials may be extended to other countries' specifications. Public as well as private money has been wasted in the past on applications of alleged discoveries that could not on any known scientific principle yield the expected results. Under the new Act the Comptroller-General is empowered to refuse to grant a patent in such cases. But who shall say what is scientifically impossible? Sir James Jeans has told us that only the second law of thermodynamics is entirely above suspicion as to the soundness of its basis.

B.E.A.M.A. and Ottawa

THE long-awaited statement of the British Electrical and Allied Manufacturers' Association upon the Ottawa agreements has now been issued, and appears on a later page. Its tone is optimistic, not so much regarding the immediate prospects as the ultimate effects.



Some Examples of Good Hotel Lighting

1. The ball-room at Claridge's. 2. The dining room, Old Ship Hotel, Brighton. 3. The Piccadilly Hotel restaurant. 4. The writing room of the Howard Hotel, London. 5. The bar of the "King and Queen," Brighton. 6. The lounge of the Hotel Splendide, Piccadilly, W.

Why the E.D.A. Campaign should be successful

IN conducting its present hotel-lighting campaign the British Electrical Development Association is undoubtedly assisting the electrical industry in one of the best ways possible. Lighting development is fundamental in the electrical world, and the possibilities of further expansion are immense. Perhaps this is a point that is not generally appreciated within the industry, and a realisation of the extent to which good lighting is responsible for our well-being is necessary.

But electric lighting is the forerunner of other electrical developments, and in its capacity of propaganda agent the hotel is one of its most useful platforms. To appeal to the hotel proprietor, however, we must confine ourselves to those aspects which directly concern him. His business is to attract and retain his clientele, and good lighting can play a very big part indeed in doing this.

Producing Attractive Exteriors

Exterior lighting is, of course, one of the best means of attraction, and this immediately suggests floodlighting. But are we not in danger of thinking too much in terms of floodlighting? Such exterior illumination is not the best system in *all* cases. The floodlighting of buildings in brilliantly lighted areas is wasted and some buildings are architecturally unsuitable.

It is not always realised how little light intensity is necessary effectively to illuminate the exterior of a building in an unlighted area. Certain buildings do not lend themselves to the scheme, but there is some form of lighting which will suit every case. Well-designed canopy lighting will make the most of a suitable entrance and can often be made to express the atmosphere of the establishment better than lighted walls. Outside lanterns are better than all other methods for certain classes of architecture, and they warrant more attention than is given to them.

Exterior lighting does not relate to the building only. Carriage drives can be well served by some of the many excellent public lighting systems available, to the advantage of the hotel owner. And why should not the hotel garden be illuminated? It must only be necessary to prove to the management that an extensive garden can be effectively lighted for a few pence per evening to secure much electrical business.

Inside the hotel the visitor's first impressions are received in the vestibule. This is so public a part of the premises that its efficient lighting should be the direct concern of the electrical authority. There is no excuse for a badly lighted vestibule. Cornice and panel lighting suit many types of architecture, and generally they are not expensive.

Other public apartments, such as the dining room, lounge, smoke room, ballroom and reading and writing rooms, should also be of direct concern to the electrical authority. The necessary combination of "atmosphere" and restfulness depend on the correct mixture of general and local lighting. The mistake is often made of depending on the table lamps partly for general lighting. They best serve for effect only. Panel and cornice lighting is appropriate in most dining rooms.

In the ballroom there is scope for more and more light, but without glare. It is the place for lighting *fittings*—ornamental lighting—but there is no reason why they should not supplement well-designed concealed lighting.

Wall brackets in the lounge and smoke room can almost always be employed to supplement the general lighting. Local lighting is an essential feature of the writing and reading room, but it should not be overdone. It should be local lighting only.

And what of the bar? Is there a place in which lighting can do better service for both the hotel keeper and the electrical industry than in this popular department? Display is wanted rather than effect, although lighting cunningly concealed behind bottles of good cheer can be very effective and profitable. There is much evidence in many hotels of an "anything will do for the corridor" attitude, but corridors and dark stairways provide opportunities for unique effect by virtue of their peculiar constructions, and "surprise" effects can be used to brighten what are usually the dullest parts of hotels.

The Empire Room of the Trocadero Restaurant

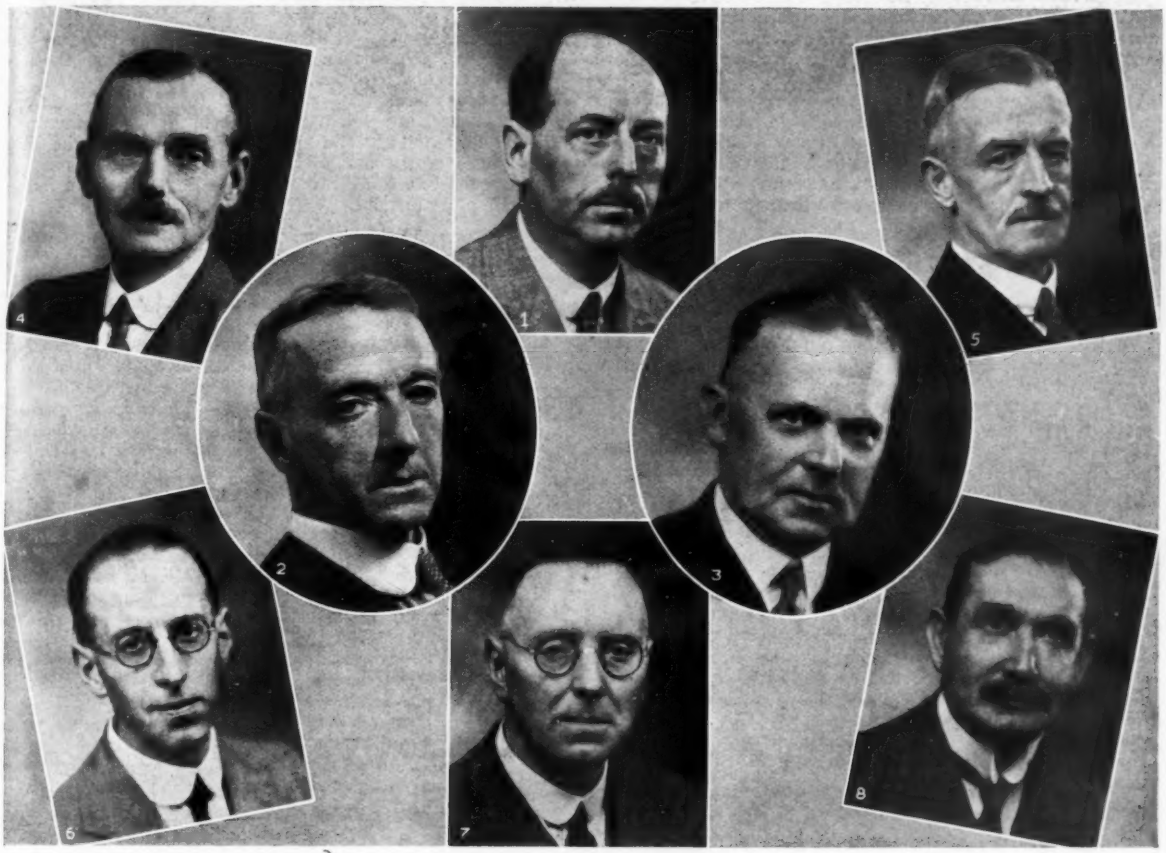
Colour Schemes

Decoration by light is a matter which seems to have been somewhat neglected of late, although the matter has never been thoroughly exploited in spite of its possibilities. Colour schemes can be "set" at will. Off the stage the hotel seems to be one of the best fields for the development of this idea, particularly in the ballroom and other public rooms.

When the hotel proprietors appreciate fully what lighting can achieve by way of effect (non-spectacular) the electrical industry will be so much the richer. On this and the preceding pages we illustrate a few examples of good modern lighting in hotels and restaurants to show what can be done. Upon this occasion we have confined our attention to the illumination of public rooms of restaurants, ballrooms, lounges, &c. It is our intention to publish later pictures of other phases of hotel lighting.

We are indebted to the managements of the hotels illustrated for their assistance. The heading of this page depicts the restaurant of the Hotel Splendide which has recently been equipped with new fittings especially designed to harmonise with the surroundings.

Some Driving Forces in the Industry: The D.P. Battery Co., Ltd.



1. Mr. H. G. Brown, chief engineer. 2. Mr. E. S. New (*Elliott & Fry*), joint managing director. 3. Mr. J. Waddell, chairman and joint managing director. 4. Mr. T. C. Elliott (*Wykeham Studios*), London manager. 5. Mr. R. Smith, chief chemist. 6. Mr. R. Thornhill, publicity manager. 7. Mr. J. Nadin, estimating and sales. 8. Mr. A. R. Brand, J.P., secretary. (*Photographs by J. R. Board, Buxton, except where otherwise stated.*)

Overhead Earth Wires. By S. Austen Stigant, M.I.E.E., F.Am.I.E.E.

OVERHEAD earth wires on high-voltage lines serve a single or dual purpose, according to their position in relation to the power conductors. When placed beneath the conductors they serve to reduce the voltage to earth *induced* on the conductors by a lightning discharge between cloud and cloud or between a cloud and earth; in this position they offer practically no protection to the conductors against the effects of a direct stroke. When placed above the conductors they reduce the voltage to earth induced on the conductors, and in addition they offer substantial protection against the effects of direct lightning strokes.

Earth wires below the conductors may be of galvanised steel, but when placed above they should be of the same material as the conductors to give mechanical strength and reliability. For protection against induced voltages the earth wires should be placed as close to the power conductors as possible. When given spacings between the earth wires and the conductors, the protective effect increases with the height of the line.

Direct Lightning Strokes

For protection against direct strokes the earth wires should be placed as high above ground level as the economics of the line permit. In the case of horizontal configuration of conductors, the direct-stroke earth wires will give a practical maximum protection against side strokes to the outer conductors if placed at such a height that a line joining the outer conductor and earth wire centres makes an angle of 15 to 20 deg. with the vertical. For vertically arranged conductors the earth wires should preferably be placed vertically above the outer conductors.

For pressures of 66 kV and above the normal line insulation is such that induced lightning voltages cause practically no trouble, and direct strokes only need to be guarded against. Below this pressure the normal insulation of the lines and plant connected thereto is at such a level that induced lightning voltages (which incidentally are more frequently present than direct stroke voltages) become a predominating cause of transformer and switch failures, the blowing of fuses, and insulator and bushing flashovers.

On lines for 66 kV and over it is essential to place the earth wires *above* the power conductors; while it is preferable to do this for all lines there may be some economic justification for placing the earth wires *below* the conductors on the lower voltage lines, except in areas where severe lightning storms are experienced.

Protection Against Induced Voltages

Protective values of earth wires against the effects of induced lightning voltages on the power conductors depend principally upon the capacitances between the charged cloud, power conductors, earth wires and earth and upon the impedance of the actual connections to earth. Investigations made into the magnitude of protection afforded by twenty-six different arrangements, corresponding to the relative conductor and earth-wire spacings used in practice for high voltage lines, indicate much higher degrees of protection than can be shown by calculation; this is probably due to corona on the wires under lightning conditions which increases the capacitances between the power conductors and earth wires.

The percentage decrease in induced voltage for a single conductor within three earth wires in triangular formation is 84, and with four earth wires above and below and at each side is 94. One earth wire above the middle of three conductors in horizontal formation gives a decrease of 56 to that conductor and 48 to the others; placed below, the values become 53 and 43 (the least satisfactory of any scheme). Two earth wires arranged above in the usual manner give a reduction of 66 to the centre phase and 60 to the outers; one earth wire above each conductor gives 72 and 66 respectively. The best value (91) comes from four earth wires erected above and below the central conductor and in the same plane as and on the outside of the other conductors.

For double-circuit lines the best protection (69 for the outer, 74 intermediate, and 72 central conductors) is obtained by

arranging the conductors in the same plane below five earth wires; with three earth wires in the same formation the reduction in induced voltage is 61, 72, and 65.

One earth wire on the top and between three conductors arranged vertically gives a value of 54, 48, and 44, diminishing with the distance for the earth wire. An earth wire above each vertical line of power conductors gives 73, 67, and 60.

For direct stroke protection the shielding effect of the earth wires depends upon their vertical height in relation to the line wires, and also upon the horizontal distance between the projections on the two wires. If the horizontal distance be called X and the vertical height of the line wire h the earth wire should have a vertical height greater than the value of y calculated from the following equation relating the factors,

$$\frac{X}{H} = \sqrt{2\left(\frac{y}{H}\right) - \left(\frac{y}{H}\right)^2} - \sqrt{2\left(\frac{h}{H}\right) - \left(\frac{h}{H}\right)^2}$$

which gives y and h for equal strokes; y should be at least 10 per cent. greater than the value calculated from the foregoing expression. In this expression H is the height of the cloud above earth.

The chances of a line being struck increase with increasing height of the line. The earth wire also reduces the surge impedance of the line section associated with it, and thus reduces the voltage of travelling waves in that section coming in from other sections.

Modern Electro-deposition. By C. C. Downie

ALTERNATING current alone cannot be used for electrolysis, and its chemical action appears to be inconsiderable, but when superposed on a direct current it eliminates several theories of irreversibility and passivity. In processes where retardation has been most marked the superposed current is most effective. The extent of decreasing this retardation is dependent upon two main features, namely, the ratio of a.c. to d.c. strength, and the frequency employed.

It has been claimed that the higher the ratio of a.c. to d.c. strength the greater will be the reduction of retardation. In the refining of certain metals by electrolysis this claim has not been borne out in practice; a fixed figure is adhered to, but it is agreed that the ratio must exceed a certain value before the effect is made appreciable. The action has demonstrated itself to be most intense where the frequency is low. At ten cycles per second the hydrogen over-voltage is very considerably reduced and passivity in the ordinary way is prevented from exerting its usual detrimental influence. The low-frequency a.c. acts as a kind of protecting agent for the d.c. so that the latter is not limited to a particularly low figure which provides only slow deposition.

Circulating electrolytes, rotating anodes, &c., have long been in favour as they permit of more rapid deposition, but they do not allowed of a greater direct current being employed, and the rapidity of action is due only to the maintenance of the catholyte at consistent concentration. Without circulation the catholyte tends to be depleted, and circulation simply rectifies this.

The superposed a.c. opens up the way for d.c. to do more useful work. Consistency of concentration is maintained as before, but the d.c. can be applied to an extent far beyond that stipulated by the tables included in most text-books; the deposits secured are greater and the time occupied is generally much shorter. Numerous processes were formerly considered impossible of development. The reasons given were that passivity set in, stopping the reactions, and that the only means of restarting was to scrape the electrodes to expose fresh surfaces. The refining of copper where small amounts of silver were also present could be performed only at low current densities and exceedingly slowly with a large plant, because passivity set in immediately any attempts were made to hasten the deposition.

Mr. C. C. Downie has had sixteen years' experience as a metallurgical chemist

Many metals which would not dissolve in certain solutions become freely soluble in the same electrolytes when a.c. is superposed. In order to elucidate the mechanism of depolarising action, the oscillograph has been used.

Practical Applications

The first technical application of superposed alternating current was in the refining of gold. This was done largely to save bank interest, as much time was wasted because of the slowness of the ordinary electrolytic process. At a later date silver was also refined in this manner, and latterly copper containing small amounts of precious metals the deposition of which had long baffled many scientists has been electrolysed rapidly and efficiently by means of the dual current.

The latest achievement is that of breaking up complex alloys into their constituent metals, which by pyro-metallurgical methods would have been very costly. The plant consists of a d.c. generator (the cables from which are led directly to the electrolytic baths), and a variable-frequency alternator. The tanks are usually lead-lined vats equipped with heating coils which maintain the electrolyte at a fixed temperature throughout the operations.

The electrolyte flows from the deposition tanks to a storage tank outside, and in some instances it is necessary to have a filter press lined with acid-resisting metal to remove solid matter. It is transferred thence to a supply tank overhead by means of a centrifugal pump operated by a mercury switch. When starting on the electrolysis of some metal which has not hitherto been handled, it is generally considered advisable to check the accuracy of the ammeters, prior to calculating the most suitable ratio of alternating to direct current.

The best results from the refining of cast-anode plates, general electrolysis, and even certain electro-plating practice have all been secured by introducing the a.c. and d.c. simultaneously. A change in the ratio of alternating current to direct current strength often permits of a greater rapidity of deposition. A further development is that those metals which are simply electrolysed but which, as is usually the case, become passive at higher current densities, may be preserved in the active condition at greater densities by superposing a.c. of the correct frequency. When working with comparatively transparent electrolytes, a close examination will reveal the difference which the superposed current makes to the bubbles of hydrogen and oxygen as they rise to the surface.

Complex Alloys

Various scrap alloys which were once sold at a low figure because of their complex nature and the lack of demand for them are nowadays melted and cast into anode plates. This largely applies to nickel-copper-zinc alloys, containing numerous impurities in the nature of iron, tin, and even antimony.

Diaphragms are used either of earthenware, or fibre, into which are placed the anode plates. The electrolyte is usually either a sulphuric acid or hydrochloric acid solution in which the metal constituent is not allowed to fall below a fixed figure. This is done with a view to ensuring the metals being deposited in their classified order. Meanwhile, such insoluble matter as has been formed is retained in the diaphragm and cannot pollute the electrolyte. Prior to the foregoing system being officially recognised, it was generally contended that comparatively little could be done in the way of manipulating the anodic deposit.

When handling complex alloys various constituents may appear at the anode. Superposed a.c. lowers the oxidising potential and thus directly influences the nature or course of the anodic reaction. A selective anodic deposit may be removed whilst the cathode starting sheets are receiving their usual metallic deposit. It has been demonstrated that it is sometimes possible to recover anodic products (lead, manganese, &c.) in an intermediate condition of oxidation, which under ordinary d.c. conditions would be raised to highly oxidised compounds. Developments in this section will be followed with considerable interest by members of the chemical industries.

With complex alloys it is sometimes necessary to deposit copper first, remove the cathodes, and replace the starting sheets. The composition of the electrolyte is then altered either by dilution or the addition of more acid, and the nickel in the electrolyte is deposited on iron starting sheets. The deposit in the diaphragms, or anode sludge, is removed, dried, melted with suitable fluxes, and also cast into anode plates. These plates are composed of metals such as tin, lead, and antimony, and if properly fluxed should be comparatively free from impurities. The electrolysis is now conducted in an alkaline electrolyte, and the tin removed from the antimony and lead. This requires the use of other depositing tanks, but the same conditions prevail in applying the direct and superposed alternating current.

The Integral Electric Drive. By G. W. Batchelor

Its application to machine tools

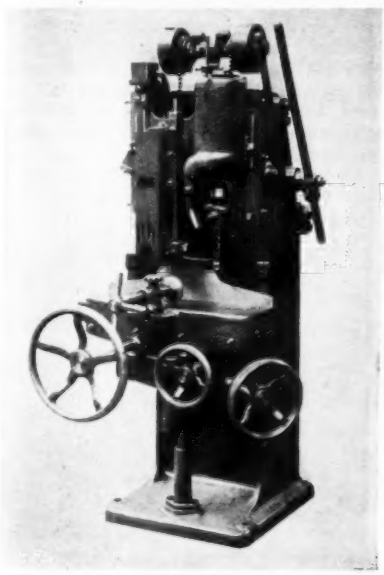
THE individual motor drive is the most convenient method of applying electric power to machine tools. A self-contained drive allows of cheap and quick installation together with easy change of position if required subsequently when regrouping, and eliminates line shafting with its noise, dirt, vibration, and light-obscuring propensity.

Motors are often mounted on a bracket or pedestal beside machines obviously designed for belt drive. A progressive step is the attachment to the machine tool of a foot or endshield-mounted direct-coupled motor, and these arrangements represent a useful intermediate stage between the " find-your-own drive " type of design and the modern all-electric machine tool complete with integral built-in motors and control gear, ready to plug into any convenient power socket.

The Direct Drive in Woodworking

Woodworking machine designers have quickly appreciated the advantages of direct drive to such applications as wood tenoners, with ten or twelve spindles in closely spaced groups, multi-spindle planing and moulding machines, mortising machines, saws and drills.

The external frames of many of these motors embody lugs, slides, trunnions or facings, and the shafts may be of unusual dimensions, or formed with a socket. These specialised mechanical features belong rightfully to the machine tool and are better designed by its makers as integral parts. Where housing and shaft are thus members of the machine, only the essential electrical parts of the motor are required to complete the assembly.

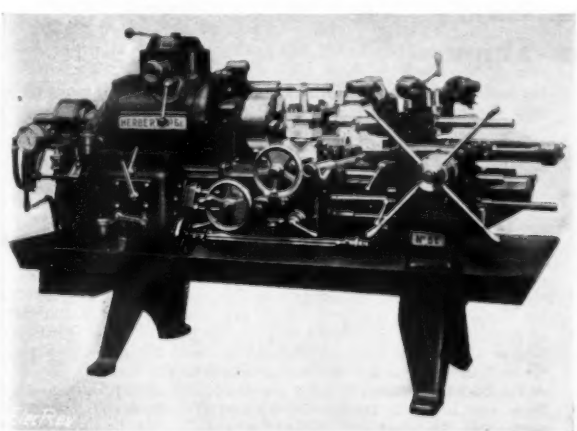


Chain and hollow-chisel mortising machine showing stator and rotor unit built into chisel head

This " built-in " construction has been achieved by the development of induction motor stator and rotor units, consisting of a stator without frame or endshields and a rotor without shaft or bearings, the rotor being mounted directly upon an operating spindle.

Such units occupy the minimum space, since all extraneous mechanical members conform exactly to the required position and duty, whilst many different housings may utilise standardised electrical units.

An integrally driven machine tool is not limited by belt slip,



A high-speed capstan lathe with headstock forming the motor frame

and the electrical characteristics of its motor can be designed to follow the requirements of the duty in every instance in which this class of tool is employed.

Electrical Units " Build In " Easily

The comparative ease of " building in " electrical units often causes surprise to the at first diffident and afterwards enthusiastic machine-tool maker, whose previous handling of electric drive may have been limited to the attachment of complete foot-mounted motors.

Mr. G. W. Batchelor is engineer in charge of the Machine Tool Section of the B.T.-H. Co.

The problems encountered when building in stator and rotor units of normal speed are the purely mechanical points of fit and alignment, whilst the limits of tolerance are no finer than are needed in the construction of any high-class machine tool.

The units are, of course, mechanically self-supporting, arranged for safe and convenient handling outside their factory of origin. Each unit is finished with concentric bore and periphery and in assembly the machine tool maker takes care that the bore of his frame, end spigots, and bearing housing are also concentric and parallel, thus ensuring a uniform cylindrical air gap between stator and rotor—with a reasonable margin of tolerance. Since various troubles can arise from a seriously uneven air gap, this point is of importance.

Methods of mounting are divided roughly into two types depending upon their application :—

(a) A stator housing is formed in some appropriate member of the machine tool, the rotor spindle bearings being mounted in endplates which are securely spigoted to the housing.

(b) No stator housing is used, but endplates are spigoted directly on to the actual stator unit the ends and periphery of which are accurately ground to fine limits.

One endplate may be part of a gear box or other adjacent member.

Ventilation depends upon the duty and other factors, and should be arranged in consultation with the maker of the electrical unit.

Advantages for Metal Working

The application of built-in units to metal-working machine tools has lagged slightly behind their use in woodworking owing to inherently different problems. Recent developments indicate keen appreciation by metal-working machine tool makers of the adaptability, space economy, and appearance gained by designing for built-in units, particularly in the cases of auxiliary movements and small power main drives.

High-speed cutting tools, such as small metal drills or woodworking routers, offer an interesting field. Simple, robust induction motors are built directly around the tool spindle, and run at operating speeds of 10,000, 15,000, 20,000 r.p.m., or even higher. It is necessary to step up the supply frequency, by means of a frequency changer, to a value high enough to obtain the required speed. Elimination of the restriction of movement and avoidance of the stresses imposed by belt drive, together with abolition of belt maintenance, usually justify the extra capital cost of a frequency changer.

Where different operating speeds are necessary as for turning, drilling, tapping and auxiliary drives such as feeds, cone pulleys are being replaced by simply operated change speed induction motors. These change-pole machines are also used to supplement or, in some cases, entirely to replace a gear box.

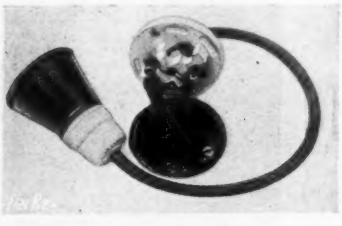
The use of built-in direct current units has made but little progress owing partly to the small and diminishing demand, but more particularly to inherent differences in construction as compared with the squirrel-cage induction motor unit which has only two parts—a wound stator and a simple, almost indestructible rotor. The d.c. motor has, on the other hand, wound salient poles requiring larger diameter, brush gear and commutator, all of which introduce difficulties when assembling in the machine tool.

Wiring Installations. By John M. Hulley

Suggested improvements upon the looping-in system

INTERNAL wiring in conduit for lighting installations has, so far as I am aware, undergone no change for many years. We still plod along after our forefathers, looping in and looping out, never stopping to think if this system could be improved upon. The scheme herewith put forward, which has come up to all expectations in practice, overcomes some of the drawbacks of the loop-in system.

The first illustration shows, from an internal wiring point of view, what the ordinary type of S/R ceiling rose looks like, with the present loop-in system.



Plain pendant and ceiling rose on a loop-in system

It is well known in the electrical world that the v.i.r. cables used in such installations become brittle or hard in time, and that the time taken to reach the brittle stage is increased by the present-day practice of ceiling lighting, where the heat from the lamp tends to concentrate upon the iron ceiling box. The circulation of air through the pipes would, to a certain extent, counteract this, but this is not practicable, especially when there are four or five 3/.036 in. cables in ¾-in. conduit. When it is required to repair a pendant the S/R ceiling rose has to be pulled down at right angles to the ceiling box, so that the necessary connections can be made. Unless this is done very carefully the v.i.r. cables will be strained at the neck of the box, and the rubber will in most cases crack.

When the usual earths and short circuits occur the majority of electricians, in my experience, will put some black adhesive tape between the conduit and wires or between wires. The best course would be to rewire that part of the circuit, but this would entail the rewiring of the complete circuit, as tampering with the other cables would be liable to affect them.

noticeable when looping the feeds at switches, owing to the terminal hole being smaller than is the case with the S/R ceiling rose.

The three pictures reproduced together, which are practically self-explanatory, show a method of obviating the difficulty. The main v.i.r. cables are connected in the terminal block of the porcelain interior, and the pendant for the light in the usual manner. There is therefore no chance of the cables being tampered with, as they are fixed permanently. Another advantage is that during painting operations the ceiling plate can be lowered by loosening the two fixing screws. This would give the painters an indication that the ceiling plate is not an integral part of the ceiling.

The last figure shows an ordinary M I box with a porcelain interior fitted. This does away with looping in and out at switches, and is a great boon for testing purposes. It will be appreciated that there is now no need for the old method of pushing pins into the cables and testing with a lamp, or for nicking the cables with a knife and then omitting to tape them. The cost of the system is slightly greater than that of the loop-in method, owing to the price paid for the porcelain interiors and the porcelain ceiling plate, but, with a greater demand, the cost should fall considerably. In any case, looping in and out at switches and lighting points is saved, and this, in some installations, would off-set the cost of the interiors.

A three-way box suitable for looping to switches, &c.

The ceiling plate shown is an ordinary S/R ceiling rose with the back terminal block cut away. It will also be noticed

Left: Batten holder with porcelain interior. Centre: Plain pendant with porcelain interior and ceiling plate. Right: Plain pendant with porcelain interior suitable for a back outlet box

The illustration shows one negative loop only, but in many cases it will be found that two loops, and even three, are taken away from the one joint. This means that when the cables are twisted together it becomes an impossibility to get them into the connecting terminal. As a rule some of the cable strands are then cut to facilitate wiring. This is more that c.t.s. has been used instead of the ordinary twisted flexible, as dirt and flies do not accumulate to the same extent with the former.

Messrs. Simplex made these porcelain interiors for me, and they were used in the wiring of a hospital, where they have given every satisfaction.

Electric Ships

THE annual report on the operations of Lloyd's Register of Shipping in 1931-32 records that during the course of the year 127 vessels, of 598,247 tons gross, were fitted with internal combustion engines; geared steam turbines were fitted in ten new ships, of 84,640 tons; but only four ships, of 73,667 tons, were built for turbo-electric propulsion, namely, the 22,547-ton *Strathnaver*, the 22,544-ton *Strathaird*, the 22,424-ton *Monarch of Bermuda*, and the 6,152-ton *Rangatira*. In addition the new 22,500-ton *Queen of Bermuda*, sister ship to the *Monarch of Bermuda*, which is now being completed, is being fitted with turbo-electric machinery, and the 2,350-ton yacht *Hussar* (built by Messrs. Fried. Krupp) is Diesel-electrically driven.

In the Society's 1932-33 Register Book there are forty-two turbo-electric ships, of 388,962 gross tons, and forty-eight Diesel-electric ships, of 116,684 tons. In three ships an exhaust steam turbine has been used to assist in driving the main engine shaft. In the s.s. *Erin* the turbine drives a directly coupled electric generator, which supplies power to a motor mounted on the main shafting. There is also a proposal for driving a generator to supply electricity to a reheating device through which the steam from the h.p. cylinder passes on its way to the i.p. cylinder.

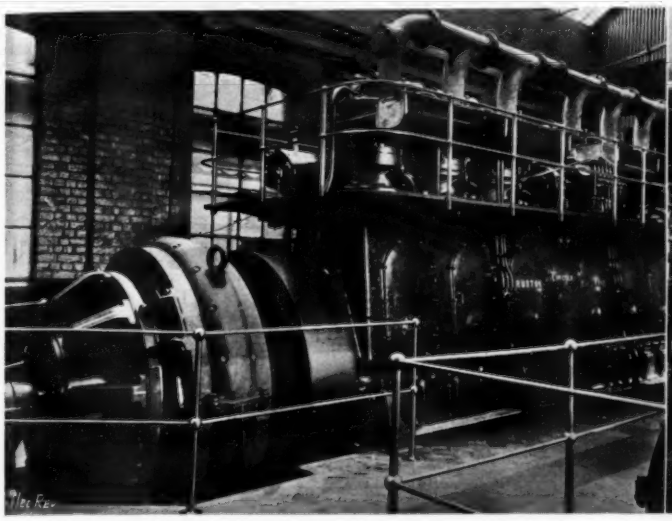
During the year the Committee has approved of the revision of the rules for the application of electric arc welding to ship construction. Recently electrodes have been designed, and methods of working perfected, for depositing metal which corresponds in respect of ductility with the minimum standards laid down by the Society. The basis of the regulations is that the electrodes shall be approved after tests have been made under actual working conditions, and the electrodes themselves have been divided into two classes. The electrodes in the first class are considered to be suitable for employment on those parts of a vessel which are not of primary structural importance, and the electrodes in the second class, for which additional tests are necessary, can be used for parts of a vessel which are of primary structural importance.

The nature of these tests, together with the progress which has been made in recent times, has now rendered it unnecessary for the notation "Experimental" to be assigned to ships classed in the Society's Register Book as electrically welded, either in whole or in part.

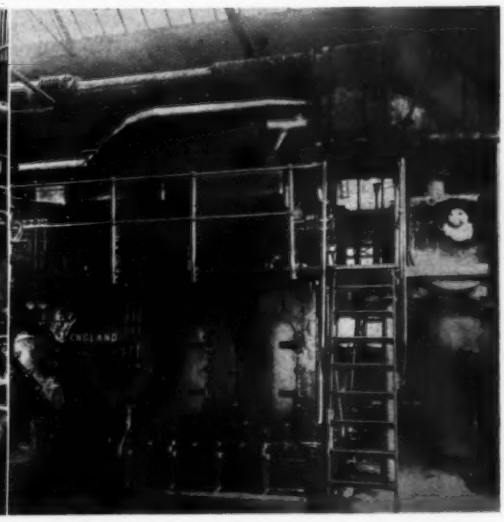
Oil-engine Operation at Ashford

A RECENT visit to the Ashford (Kent) electricity works was particularly profitable for two reasons. First, we obtained some interesting results of the first year's working of the latest oil-engine set installed, and secondly these results, coupled with observations by Mr. H. Wilson, the chief engineer, shed new light on the question of bulk supply *versus* local generation.

The set in question is rated at 900 kW on a two hours' continuous running basis, or at 810 kW for normal service. During the year ended September 3rd last the equipment was running on load for 4,314 hours, and generated 2,638,160 kWh, representing 40 per cent. of the total kWh generated by the whole of the station. The running plant load factor for the set was 68 per cent. An average of 0.55 lb. of fuel oil was consumed by the engine per kWh generated, representing 0.161d. per kWh with fuel oil at 54s. 9d. per ton (average). At existing crude oil prices (52s. 9d.) the cost would have been 0.156d. per kWh generated.



The 1,200-h.p. super-charged oil engine at Ashford



Super-charging equipment in position on the engine

The lubricating oil consumption was 0.42 gal. per running hour, or 0.000686 gal. per kWh generated. The average price paid for lubricating oil was 2s. 7.32d. per gal., or 0.0215d. per kWh generated.

Maintenance cost about £225, *i.e.*, 0.0205d. per kWh generated. The total cost of these items was therefore 0.2030d. per kWh generated.

Reckoning on the basis of one man at 1s. 6d. per hour during the whole of the running period, we have an additional charge of 0.029d. per kWh generated for running labour. Costs for such auxiliaries and services as the stream-line oil filter, which consumed 9.870 kWh, and water pumping, calculated at £41.6, we can consider £100 as erring on the extravagant side. This makes an addition of 0.009d. per kWh generated, so that the inclusive total cost is 0.241d. per kWh.

The initial cost of the engine, alternator, and foundations was £8,000, and the capital repayments and interest amount to 11.2 per cent., or £896 per year, representing a capital charge of 0.082d. per kWh generated, and a total of 0.323d. per kWh as the total for capital and running charges. Allowing another £300 for auxiliaries (0.003d. per kWh), the grand total is 0.326d. per kWh generated as the grand total. It should be noted that the capital charge figures are based on the assumption that the life of the engine is only that of the loan period, namely, twelve years, and no allowance has been made for buildings and switchgear. The capital charge per kW per annum is £1.

A Comparison with Bulk Supply

Mr. Wilson has made a comparison between the costs of a further oil-engine generating set, based on a past tender by the makers of the equipment under review, and the cost of a supply by a proposed transmission line from Folkestone with bulk supply charges of £3 per kW and 0.2d. per kWh. To the £10 per kW for the cost of the engine and alternator £2 is added for foundations, auxiliaries, switchgear, and all possible contingencies. This gives a probably exaggerated figure of £1 7s. per kW per annum. Allowing for 25 per cent. of stand-by plant and 10s. per kW for repairs and maintenance, the total is £2 6s. per kW per annum.

The engineer aims at his undertaking owning the transmission line from Folkestone, and estimates for the first ten years only running costs totalling £2 5s. per kW per year. Hence it appears that the total bulk supply charges would be £5 5s. per kW and 0.2d. per kWh, and the local generation charges £2 6s. per kW and 0.22d. per kWh generated.

A survey of the position at Ashford would be more interesting with figures for the station as a whole corresponding to those for the new set during its year of operation, but the nearest approach we have to these are statistics for the year ended March, 1932. The maximum load on the station increased from 1,980 to 2,184 kW, and the total plant capacity was 3,500 kW. The station load factor was 33.05 per cent., and the output increased from 5,390,325 to 6,338,400 kWh. The capital expenditure at the end of the year was £229,930, fuel-oil consumption was 0.624 lb. per kWh generated, and the cost per kWh sold 0.217d. The total costs per kWh sold was 0.476d. During the year there was an increase in the numbre of consumers from 3,952 to 5,076, and the net profit rose from £1,945 to £3,208.

Results Attributed to Super-charging

The excellent results obtained by the new set are largely due to super-charging, and the engine is believed to be one of the first of its kind to be so equipped in this country. It is a six-cylinder, vertical, airless-injection oil engine manufactured by Messrs. Ruston & Hornsby, Ltd. Rated at 850 h.p. without a super-charger, it will now develop 1,200 h.p. It operates on the four-stroke-cycle principle, and has a compression pressure, without super-charging, of 370 lb. per sq. in. The stroke is 24 in. and the bore 18¼ in.

Super-charging provides for a greater consumption of fuel by increased admission of air for combustion. The Buchi system of super-charging has been adopted, the equipment being supplied by Messrs. Brown, Boveri & Co., Ltd. This includes a turbine driven by the exhaust gases coupled to a blower for delivering air slightly above atmospheric pressure to the cylinders, the compact turbine and blower running at 6,250 r.p.m. The two exhaust manifolds from the engine are led to separate inlets on the turbine casing, while there is a common outlet to atmosphere. Air inlets to the cylinders are taken from a common main from the blower. Appreciable overlap provided by the timings of the exhaust and inlet valves results in scavenging of the cylinder clearance spaces of exhaust gases. The blower is two staged, and the impellers and the turbine impulse wheel are mounted on a common shaft carried in two bearings, with the turbine wheel overhung. Lubricating oil is supplied under pressure.

To avoid excessive temperatures in the bearing between the turbine and the blower there is an air-cooled gland immediately behind the turbine wheel. The casings are divided horizontally to facilitate inspection, and the turbine wheel and blades permit gas temperatures up to 500 deg. C. There is no special speed regulating apparatus, because the speed of the turbine automatically adjusts itself to satisfy different outputs of the engine within wide limits. The blower outlet and the turbine inlet pressures are 3.66 and 3.25 lb. per sq. in. After the gases have been used in the turbine they are further employed to raise steam in an exhaust gas boiler which serves for office heating, &c.

The engine is directly coupled to a 900-kW English Electric alternator set.

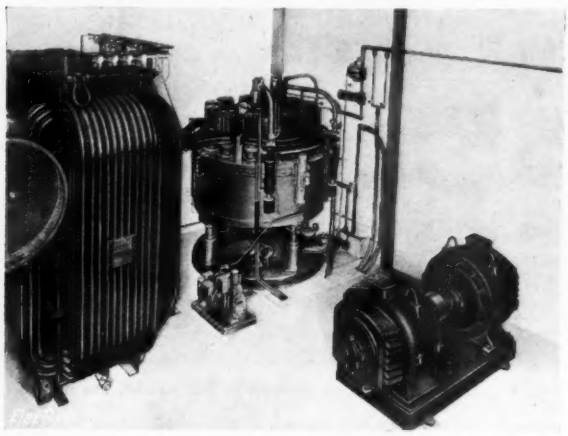
MEETINGS AND DISCUSSIONS

Current Topics and Opinions Expressed at the Institutions

The Electrical Industry—Parochial or National ?

WHILE the paper with this title which Mr. H. Hooper read at the East Midland Sub-Centre of the INSTITUTION OF ELECTRICAL ENGINEERS at Loughborough on November 1st supports the "national" outlook, it does not imply Government control. It suggests that a wider outlook than the "parochial" is necessary on the lines of a national association or board. Certain of the conclusions indicated are provocative and some of the difficulties are stupendous, but if narrow partisanship is avoided they should not be insuperable.

We are daily becoming more "co-partner-like" in industry. On the generation side the national outlook will predominate,



A view of the plant at the new Ilford Town Hall sub-station described on page 690

and it is confidently hoped that of the savings to be effected by the operation of the C.E.B. the surplus will be returned to the industry. Important beneficial results will accrue to the general electrical development of the country as a consequence of adding railway electrification to the national grid system. Definite advancement in this direction cannot be achieved parochially.

The present tendency of municipalities to abandon tramways is monthly taking load off the generating stations. Surely a national fight would be more advantageous than parochial arguments in favour of railless trolley buses?

The existence of the Overhead Lines Association is a step towards the national aspect of secondary transmission and distribution lines. Its aims to bridge the gap between maker and user, meet working conditions, and reduce operating costs are the reverse of the parochial outlook.

Unification and centralisation are keystones in industry to-day, and, whether we like it or not, politicians will delve into the subject of electricity. As an instance of this there was the Rt. Hon. Arthur Henderson's statement, issued on behalf of the Labour Party, on national planning for the electricity supply industry and the need for unification of ownership. The author hopes that such a desperate remedy will never be required, but it will be unwise to dismiss the programme with ridicule.

Surely, asks Mr. Hooper, more uniform tariffs could be adopted if the matter were put into the hands of some national executive, or board, appointed by the authorities themselves? A point worthy of consideration is the creation of a special off-peak load tariff. If it were made reasonably low there is prospective business up to one million kVA which could be obtained in this country in fifteen years. The yearly consumption for heating large buildings averages 1,000 kWh per annum per kVA installed, which indicates that a load should accrue by the end of fifteen years of one thousand million kWh per annum, off peak and entirely additional to standard industrial development. Rural electrification also is a matter for a national executive rather than a few individuals.

The Rationalisation of Manufacturing

There is a great difference between rationalisation and socialism. On the industrial side of the electrical industry there is a clear case for the national outlook. It is appalling to think of the unnecessary waste of time and expense in manufacturing works caused by overlapping. If, say, one group made heavy switchgear only, another group made medium gear, and a third produced only domestic and light industrial requirements, prices would fall, quality would improve, and better service would be given generally. Labour is the prime cost of manufactured goods, not materials. Difficulties of allocation would arise, of course, but they would not be insuperable.

The proposals that a national canvass should be undertaken to secure new consumers everywhere and that a big convention should be held next year Mr. Hooper regards as signs of the times. United action on behalf of the engineering institutions also would benefit the profession and industry.

The main questions are: Are we going to utilise this electrical age individually or collectively? And are we going to see "the writing on the wall" in time to save ourselves from ourselves?

Good Future Prospects for the Engineer

AT an informal meeting of the INSTITUTION OF ELECTRICAL ENGINEERS in London on October 24th the subject discussed was "The Future Prospect for the Electrical Engineer." Dr. E. W. Marchant, president, commenced the proceedings by reviewing the several branches into which the industry is divided and considering the possibilities of their extension in the very near future.

The future is, he thinks, undoubtedly full of promise for the industry as a whole and "enormous developments are coming in the next few years." The greatest scope for engineers is probably in the extension of the uses of electricity in rural areas. Incidentally, a good post awaits the man who can devise a way of cheapening the cost of overhead connections from the grid to the distribution lines.

While the urgent demand for cheapness thwarts sounder construction, much of the present-day domestic apparatus is evidently in need of better design to make it more serviceable. The vital importance of efficiency enlarges the field for accurate measurement, and those interested in this section of the profession will find that the construction of meters and instruments affords considerable scope. A marked development of the telephone service is also certain, particularly in rural areas, as means of communication with markets is essential to every farmer.

Finally research must have more recognition in future. As yet it does not bring the large financial rewards of the commercial side, but electrical research has undoubtedly an enormous future.

Illumination Engineering as an Art

THE first half of the paper which Mr. A. B. Read and Dr. J. W. T. Walsh read at the INSTITUTION OF ELECTRICAL ENGINEERS in London on November 3rd emphasises the relationship between modern lighting design and contemporary practice in architecture and decoration, due to the use of new constructional methods and materials.

Various forms of lighting are described briefly, leading up to the more recent influence that lighting by electricity is having on architectural form, and the results achieved by those who have freed themselves from the trammels of tradition.

The second part of the paper deals with the engineering and physiological principles which must necessarily govern the design to some considerable extent. It describes the characteristics of modern light sources and of the materials now available to the artist in light, particularly diffusing glass of various sorts. The visual factors entering into lighting problems are discussed, with particular reference to glare and its avoidance. The necessity for adequate contrasts, the proper utilisation of shadows, and the importance of colour in lighting are pointed out.

We are becoming "light-conscious," and in any important scheme the practice of providing a number of lighting points by cursory glances at plans of buildings already in course of construction will soon be regarded as ridiculous and as disastrous as to decide positions of windows and staircases after the steelwork of a building has been erected.

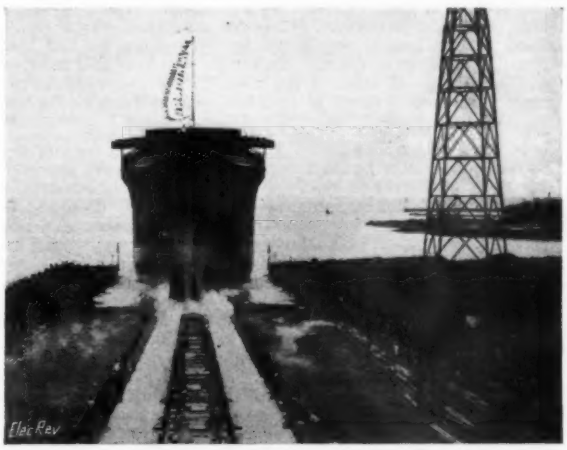
There is an ever-growing number of small houses lived in by men and women of moderate means which have made opportunities for introducing simple features with light that have added charm and character to what would otherwise have been stereotyped and dull interiors. Instead of spending the greater proportion of money on the actual wall decoration and fur-

nishings, thought given to lighting and its installation has brought life and interest which could have been produced in no other way. There are innumerable ways of employing light to form an architectural unit or surface of a room to give, in addition to its practical illumination, by its shape and its effect, considerable æsthetic satisfaction.

It is a curious fact that we concentrate in a shortsighted way, unceasingly, on the perfecting of industrial processes and production while being rather careless of their ultimate employment. Here we have an intricate system of installation, cables, switches and lamps, all representing the products of long research and experiment by scientists and engineers of high standing, to operate features of lighting often crudely conceived. If electric lighting is to bring honour upon itself it must be handled with sensitiveness and a sense of proportion. In the final effect harmony and unity of conception must be preserved, and, to achieve this, engineering science must be directed with restraint and taste. There is a tendency, through over-enthusiasm and familiarity with modern methods of lighting, to serve up feasts of illumination cunningly and painstakingly prepared which we are unable to digest.

It is not in the homes of the rich or the highly intellectual that the best decoration or lighting is to be found, but generally in houses and flats occupied by intelligent people whose views on lighting, as on other important matters, are unprejudiced and progressive. They furnish not to impress their friends or to gain notoriety, but for the reason that they enjoy their surroundings. They are particularly concerned with the problem of how best to adapt light to their own requirements, and to introduce with thought and discretion this power for good that really exerts such a tremendous influence on their health and moods.

The task of the lighting engineer is no simple one, even when, as used to be the case, he does not attempt to do more than provide the necessary light without extravagance in power and with due regard to the requirements of the eye. This, however, is not enough to-day. To his knowledge of engineering and of the mechanism of vision he must add a nice judgment of design, and sometimes even the creative power of the artist. Modern lighting is an applied art, and the lighting engineer, if he is to fulfil his destiny, must be nothing more or less than an artist in light.



The launching of the *Normandie* on Saturday last at St. Nazaire by the wife of the French President, Mme. le Brun. This is the world's largest liner (78,000 tons), and has turbo-electric propulsion equipment supplied by the French Alsthom concern

Electrostatic Light Modulation

FOR television receivers which employ an arc light and the Kerr effect as the means of light modulation (in place of a neon lamp) Nicol rhombs enjoy an almost exclusive popularity.

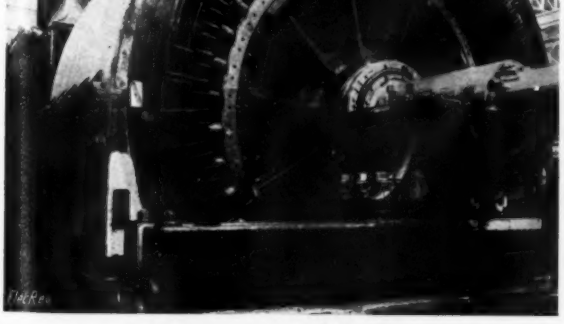
In a paper which Mr. L. M. Myers contributed to the TELEVISION SOCIETY recently in London some details are given of how it is possible to dispense with the Nicol cell polariser and use instead a simple piece of spar cemented to a glass prism. The prismatic angles of the glass and spar in the polariser are so arranged as to produce two distinct images of the arc crater at a distance apart in the focal plane equal to their diameter. When the objective is correctly set the two images are not distinguishable from one another; only the aperture is focused on the screen, but if the objective is displaced a distance equal to the axial distances between the aperture and the crater images, then the illumination of the aperture is due to both the ordinary and extraordinary rays.

The result of this new optical arrangement is a picture 50 per cent. brighter than that obtainable with a Nicol rhomb (as determined by photometric comparison of the actual illumination of the spot on the screen).

It is necessary to employ a special form of mirror-drum scanning, which is being developed in the Wilson Laboratory, Conduit Street, London, W.1. The whole apparatus, including the screen, can be accommodated in a 5-ft. cube, a 4.5 by 3 ft. picture being thrown on a ground-glass screen. The receiver arc takes 30 A with 3,000 V (peak) on the Kerr cell, which is specially designed with an internal aperture.

Atmospheric Electricity

The eighteenth lecture of the " Physics in Industry " series founded by the INSTITUTE OF PHYSICS was delivered by Dr. G. C. Simpson, F.R.S., Director of the Meteorological Office, on November 2nd. Dr. Simpson took as his subject " Physics in Meteorology," and described five recent meteorological investigations which have respectively depended on an application of sound, light, heat, magnetism, and electricity.



One of the four 40,000-h.p. propelling motors of the *Normandie*

He said that terrestrial magnetism was known to be greatly affected by the activity of the sun, as was the atmosphere, but it was difficult to find any relationship between terrestrial magnetism and the atmosphere. Recently, however, Mr. J. M. Stagg, who was at present in charge of the British Polar Year Expedition to Fort Rae in Canada, had found an interesting relationship at Aberdeen between magnetic activity and the barometric pressure. Electricity played an important part in meteorology, especially in thunderstorms. The electrical field which always existed, even in fine weather, near the earth's surface was probably due to the fact that the conducting layers in the upper atmosphere, the so-called Heaviside and Appleton layers, were maintained at a potential of several million volts above ground potential. How that difference of potential was maintained was one of the main problems of atmospheric electricity. Prof. C. T. R. Wilson considered that thunderstorms were the cause, while others considered that some solar effect was responsible because the potential was highest each day when the earth's north magnetic pole pointed most directly towards the sun.

Invention and Literature

Invention and literature are very closely interwoven, and have a profound effect on civilisation, said Mr. C. Turnbull in his inaugural address as chairman of the North-Eastern Centre of the INSTITUTION OF ELECTRICAL ENGINEERS at Newcastle-on-Tyne on October 24th. The scientific novel and biography of a generation ago did much to help the vitality which science has shown in recent years. Although some people regard such books as mere fantasy, it was Jules Verne's method to begin his books with a résumé of the work done by inventors in the field with which he was to deal. The major part of the address recalls the story of the development of the Parsons steam turbine.

Electro-deposition Specifications

The Electroplaters' and Depositors' Technical Society opened its eighth session in London with a discussion on the possibility of standardising electro-deposits. The Standards Committee of the Society for some two or three years has been engaged, *inter alia*, on a revision of the nomenclature employed in electroplating and electro-chemical definitions, and also on the formation of specifications for chemicals and materials used in the electro-plating industry. It has tentatively considered the possibility of drawing up specifications for electro-deposits.

The discussion which ensued was brought to a close by Mr. S. Wernick (hon. secretary), who said that standardisation could be of two kinds. First there was the " internal " system

which existed among most big firms of engineers and had operated for many years past quite successfully. He himself had drawn up specifications for a number of electro-deposits, and the properties specified were very comprehensive. They included in one particular the appearance of the deposit, weight per unit area, adhesion of the deposit, its ductility, &c., each followed by an agreed method of testing that particular property. There was no reason why a similar kind of specification should not be worked out for use "externally," *i.e.*, amongst manufacturers, retailers, and members of the public. All sides of the trade should co-operate to provide a reasonable series of specifications and standardisation.

Marine Welding and Propulsion

In the presidential address which Mr. R. J. Walker delivered to the NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS at Newcastle-on-Tyne on October 21st, attention is directed to the considerable advance which has been effected with regard to the electric welding of ship structures within recent years, more particularly in connection with parts not subject to stress. The possibilities of an extended application of this system to the main structure, with a consequent reduction in weight and probable cost, are being more widely recognised by shipbuilders, and classification societies to-day are framing and publishing rules and regulations with a view to securing that degree of good workmanship necessary to ensure freedom from defective welding. An analysis of the various types of recent marine propelling installations tends to show that, for vessels of the liner type of large powers, steam turbines are almost universally adopted, transmitting their power through mechanical gearing, or through electric motors. So far as the conditions affecting the comfort of passengers are concerned, such as quiet running of machinery and freedom from vibration, there is nothing to choose between the mechanically geared turbine of to-day and the electric drive; but on the score of first-cost, efficiency at all proportions of power to the full load, and other technical considerations, many engineers hold the view that the advantage rests with the mechanically geared turbine drive.

New Domestic Electrical Aids

To a well-attended meeting of the Leeds and District Branch of the ELECTRICAL ASSOCIATION FOR WOMEN, Mr. W. F. Pogson, of the Yorkshire Electric Power Co., lectured on "New Domestic Electrical Appliances" on October 26th. Attention was drawn to the possibilities of colour lighting for beautifying the home by means of coloured lamps in addition to decorative fittings and shades. The use of indirect lighting whenever possible was urged strongly. It was estimated that there were no fewer than 6,000 different models of heating appliances on the British market this year. Cooking equipment did not begin and end with the cooker. Many smaller devices might be used a great deal more. For instance, a boiling ring plus a kettle were being purchased in large numbers by occupiers of small houses, including miners, who appreciated their convenience, although they could buy coal very cheaply.

Shorter Working Hours

"Factors in the Industrial Situation" was the title of the inaugural address which Mr. J. A. Hind delivered as president of the BELFAST ASSOCIATION OF ENGINEERS on October 26th. He has no solution of his own to offer for the present situation. Of the many schemes put forward the one that to him seems to have the greatest hope of success is the introduction of a system of short time on a national basis so that the unemployed may be absorbed. Those trades which are busy would work two or more short-time shifts, while those not so busy would employ as great numbers as possible in one shift. By this means vast sums spent on unemployment benefit and relief work would be saved and it would be possible to devote part of the amount so saved to the payment of a slightly higher rate of wages per hour than at present, though of course the weekly earnings of all who are at present employed would be materially reduced. By the absorption of the unemployed, labour would be in a very much more favourable position than it is to-day to reap the benefit of the improved conditions which would come as a result of the cheapening of production. It would mean a temporary reduction of the standard of living for all, but it would give reduced hours of labour.

Engineering Economics

In his address as chairman of the JUNIOR INSTITUTION OF ENGINEERS, delivered in London on October 14th, Mr. J. Foster Petrie emphasised the fact that a knowledge of engineering alone was not sufficient even for the proper conduct of engineering enterprise. The engineer must have a knowledge of the economics of engineering and be fitted to take a more active part in the management of that civilisation which he had helped so largely to create and which he alone could maintain.

Load Factor Improvement

The improvement of load factors was the subject of the inaugural address delivered by Mr. J. Morton, chief assistant engineer, West Midlands Joint Electricity Authority, as chairman of the South-Midland Centre of the INSTITUTION OF ELECTRICAL ENGINEERS on October 19th at Birmingham.

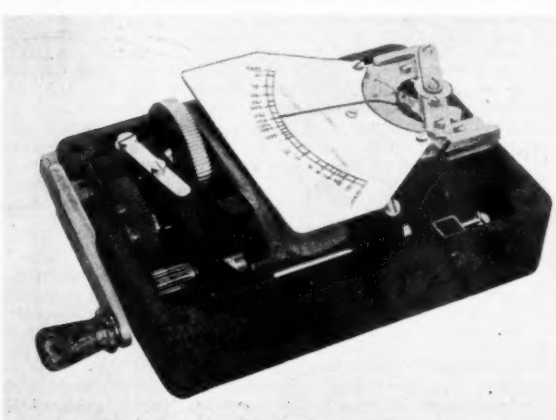
A Miniature Testing Set

OUTSIDE dimensions of only 4¾ in. by 4 in. by 2¾ in.; a 2¼ in. scale from zero to infinity, graduated from 10,000 ohms to 20 megohms; a total weight of 3 lb.; and a price as low as £8 10s., including a metal carrying case, are the somewhat unusual features of the latest development in insulation-testing instruments—the "Wee-Megger" tester. It is a further and still smaller addition to the "Megger" family of testing equipments produced by Messrs. Evershed & Vignoles, Ltd., and is, in effect, a small edition of the "Meg."

The rapid growth in electrical installations, particularly of the smaller class such as for domestic work, with portable equipment of all descriptions, is resulting in a new outlook in connection with insulation testing. It is desirable that testing of all wiring and apparatus should be carried out periodically, that the contractor should take a larger share in such routine work, and that responsible wiremen, works electricians, insurance engineers, &c., should be able to test with reasonable accuracy work on which they are engaged.

It is with a view to meeting these requirements that the "Wee-Megger" has been introduced, and the makers do not anticipate any interference with the normal business in connection with the older "Megger" apparatus.

An ohmmeter and a hand-driven d.c. generator are contained in a mottled red moulded case with a highly polished surface. The ohmmeter is of the true ratiometer type, with a pressure and current coil rigidly mounted together and carried on spring mounted jewels. The magnet is of cobalt steel. The machine-cut double reduction gear of the generator incorporates a free wheel, and the armature runs in roller bearings. The generator handle is made to fold compactly into the instrument when not in use. Special spring plunger type terminals, enabling rapid attachment and disconnection, are provided, and have no projecting or loose parts. The standard instrument is wound for 500-V testing pressure, but voltages of 250 and 100 are also obtainable. A leather carrying case for this instrument is sold at 10s. The operations in the production of the new instrument closely follow those by which the "Meg" is made (see ELEC. REV., August 12th, p. 217), although in many cases they are more delicate.



The ohmmeter and generator assembled

The exterior of a "Wee-Megger" and metal carrying case

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

Multiple Earthing

I should like to record my appreciation of the above article by Mr. Taylor in your last week's issue. This is undoubtedly a subject which will have to be tackled in the very near future, and the salient points were very conclusively dealt with by Mr. Taylor and are worthy of the serious consideration of all supply engineers. F. W. PURSE.

Westminster, S.W.1, *October 31st.*

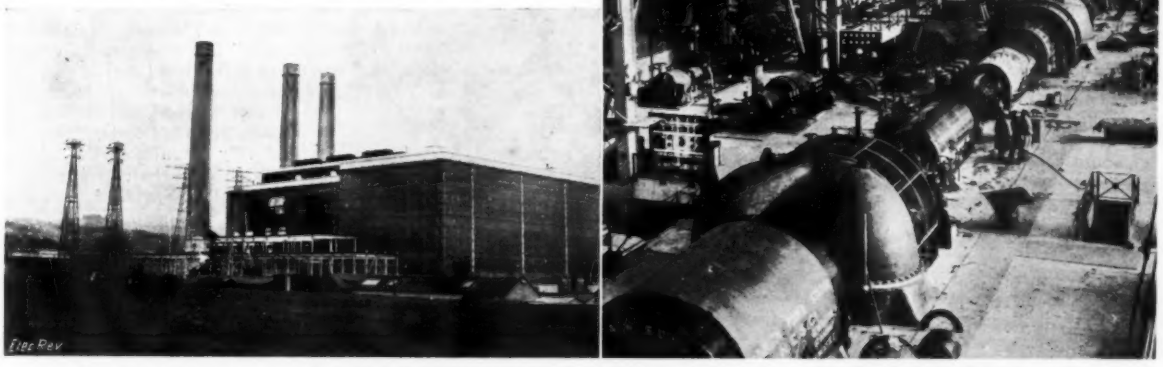
Referring to Mr. W. T. Taylor's article in your issue of October 28th I may say that multiple earthing is now compulsory on all a.c. distribution in New Zealand, and much more care has to be taken to provide efficient "earths," especially in rural areas, as the following incidents which I have had to deal with show.

At a country store, the day after being connected, it was found impossible to get horses to stand within a radius of some feet of the door, as was usual, and later in the day the wire fence became "live." Investigation showed that the phase and neutral had been wrongly connected and the phase was therefore earthed, and although the transformer was less than 100 yards distant and the neutral was doubly earthed there the fuses did not blow.

On another occasion I received an urgent call from a cheese factory; the assistants were getting shocks from the vats and work was at a standstill. Megger tests showed no fault, and the removal of section fuses at the sub-station (only 100 yards away) was ineffective, but a process of elimination showed that the fault was on a circuit supply on a farm three-quarters of a mile away. Here again the wires connecting the house had been crossed and had been connected for some months without showing any sign of trouble until the cheese factory was connected a couple of days before this happened.

No doubt had these two districts been more thickly populated the incidents would not have happened. T. WRIGLEY.

Weston-on-Trent, Derby, *October 31st.*



Two views of the Dunston power station of the North-Eastern Electric Supply Co. from which power will be supplied to a large part of the North-East Coast area. The station, which has cost about £3,000,000, is to be opened very shortly

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Speed Up Progress!

Each time the monthly consumption figures are issued by the Electricity Commissioners everybody concerned smirks and says "How wonderful we are!" Our consumption of electricity is rising while in the United States and Germany, for example, decreases are recorded as against last year. Should we not rather be ashamed at the miserably small increase of about seven per cent.?

In domestic electrification and consumption we are by far the most backward of the leading nations, and if we were expanding on really progressive and energetic lines the increase should be nearer twenty per cent. than seven per cent., even in these times of trade depression. A great city like Manchester boasts of having a little over 10,000 cookers connected. They should rather be surprised that the figure is not well over 100,000.

Having recently returned from abroad I am astounded at the large number of houses, up to, say, four years old, that have *no plug points* at all; when these are fitted they consist, in the majority of cases, of a miserable little two-pin 5-A contraption of the flimsiest and cheapest type obtainable. I have only seen power plugs in two new houses, and in only one was any attempt made to provide a cooking supply in the kitchen! Something appears to be wrong with the publicity efforts of the various authorities concerned. There are two contributory causes of our failure to make real progress: (*a*) Lack of electrical education for builders; and (*b*) misdirected publicity.

Are builders being properly tackled? In the living and bedrooms of all the houses I have seen, covering three large districts of the London "fringe," a gas point is fitted alongside the grate. Obviously the prospective owner of the house will put gas fires in the bedrooms (and probably in the drawing room) rather than go to the trouble and expense of having his own heating circuit put in *after* the house is completed.

The man-in-the-street is rapidly becoming educated up to electric heating, so why should the builder go to the expense of fitting fireplaces and overmantels in bedrooms; they will probably never be used in many instances. Is a gas fire regarded as a certainty and therefore a flue a necessity? If so, it is high time that builders were tackled on right lines. A 10/15-A heating or power point installed when the house was being wired would cost nothing like the price of a fireplace, &c.

Nowadays a house will neither sell nor let unless wired for electric light. Why not refuse to put a distributor down a new road unless the houses are wired with heating and power circuits? When dealing with domestic supplies the attitude of a large number of supply authorities is almost "pre-war."

In their showrooms the bulk of the space is taken up by lighting fittings of various attractive designs. These should all be cleared out—electric light no longer requires pushing in this manner; the local contractors and stores and even Woolworth's are fully capable of handling lighting fittings, shades, lamps, &c. In fact, they can make a better job of it than the supply showroom can.

A consumer goes into the showroom to settle the account, is attracted by a power-consuming device, and is becoming mildly interested when attention is caught by a shade or fitting of unusual design or colouring with consequential loss of interest in the power-consuming device. It should be always kept in mind that in an all-electric house lighting accounts for only about three per cent. of the total consumption. I suggest that the supply authorities should stop wasting time, money, space and drawing power on lighting fittings and get a new angle of vision, *i.e.*, "power outlets." H. T. JAGER.

Edgware, *October 24th.*

"Step on the Gas"—Again

Early in August last I sent you a letter drawing attention to the defeatist spirit spreading through the gas industry and urging the electrical industry to take advantage of it, and "step on the gas" in every sense of the term. Further evidence has since come to hand confirming the depression in the opposite camp and the opportunities it presents for a successful forward movement on our part.

Speaking at a Scottish District Conference of the British

Commercial Gas Association early this month, Sir Francis Goodenough trounced the North British Association of Gas Managers for their concentration upon technical problems and their neglect of salesmanship. "There is," he complained, "an almost complete ignoring throughout the meeting of what to me appears the vital and dominating issue that confronts the gas industry to-day: the problem of selling our service to the public more effectively and completely and so, first, maintaining, and, second, increasing, the output of gas . . . Unless we awaken quickly to the perils and needs of the times, and take all necessary means to enable us to meet and overcome them, as we can if we will, we shall awaken too late."

Sir Francis added that he was gravely concerned about the present attitude of mind in some quarters in the gas industry—the attitude that finds satisfaction in saying that the industry is "rather more than holding its own." He asked why they should not be expecting an average annual increase of output from 5 to 10 per cent.; why all the suitable rooms in all their districts are not fitted with gas fires; why there is not a gas water heater in every place where it can be satisfactorily used; why every house on the route of a gas main is not supplied with gas; and why every effort is not made to increase the sale of gas by publicity, canvassing and good service to present consumers.

The immediate reason for this "alarmist attitude and talk" was given by Sir Francis himself. The spread of the electricity grid is, he believes, likely to lead to "a full-blooded effort . . . in the not distant future, to get business for the grid by intensive advertising, propaganda and canvassing."

Now comes the *Gas World*—the Jeremiah of gas journalism—with lamentations over the stagnation in the domestic and industrial business. In its issue of October 22nd it complains that while the gas industry is waxing enthusiastic about such doubtful schemes as bottled gas and central heating, it is doing little or nothing to develop the bread and butter loads:—

> "With the single exception of the cooker, we have barely made a start upon the big potential domestic load, and even the cooker position is not so sound as it might be, owing to the large number of obsolete methods in use. Lighting is still in a most unsatisfactory position; the gas fire is still reserved for occasional heating in about one room per hundred in the homes of gas consumers; we sell a sufficient number of refrigerators to justify our talk about 'the flame that freezes' and no more; the gas iron plays second fiddle to the electric iron; the gas washer is still more or less of a rarity, and in general we have a vast amount of work ahead of us before we can feel that we are making the most of our opportunities. So it is with straightforward industrial and commercial applications of gas heating."

Electrical people should find ample encouragement from these glimpses into the distracted and despondent minds of their competitors. The future is clearly ours, and if we can bring the average effort in propaganda up to the level of the best we shall enable Sir Francis and the *Gas World* to realise their worst fears in a very short time. PROTONIUS.

October 25th.

Washboilers at Farnworth

On September 16th you were good enough to give me some of your space relating to a washboiler scheme which proved so successful. Being encouraged by the previous success, I tried another scheme from October 17th for two weeks, and in the first week booked a further ninety-four boilers. I think the secret of it is the remission of the first quarter's hire, giving thirteen weeks' free use of the boiler.

I gave my sales engineer five extra canvassers, and he had the assistance of the "Burco" sales engineer. The success of the scheme is phenomenal; the load coming as it does in the early morning of Monday and Tuesday of each week gives a desirable diversity factor.

I am convinced that good apparatus can be put on the mains if you have a sufficiently energetic sales engineer.

Farnsworth, Lancs. A. J. HUTCHINSON,
October 26th. *Engineer and Manager,*
U.D.C. Electricity Works.

Regarding a Lighting Fitting

I have read with interest the remarks made regarding the "G.V.D." fitting in your issue of October 28th (page 642), and they appear grossly to overestimate the efficiency of this particular article. It is claimed "to give a quality and intensity of illumination only otherwise obtainable by at least double the number of lamps for a similar distribution of light."

Presumably this means that the efficiency of the fitting is such that only half the usual wattage is required. If this is not so then I am unable to understand what is meant.

Let us suppose the fitting to be 100 per cent. efficient, that is all light emitted from the lamp is transmitted through the glass with no loss by absorption, then according to the claim all other fittings are only 50 per cent. efficient or even less. Most manufacturers can prove beyond question that their fittings are not so inefficient as to absorb 50 per cent. or more of the light given out by the lamp. P. S. BARTON.

Potter's Bar, *October 31st.*

The New Patents and Designs Act

The Council of the Chartered Institute of Patent Agents has refrained from suggesting in the Press that those interested in, or affected by, the provisions of the above Act should consult their patent agents, because the rules which so largely control details of procedure under the Act have not hitherto been published.

I am instructed by my Council to ask you to be good enough to publish this letter stating that the rules were signed this week and have been placed in the Patent Office library, where they can now be inspected by the public. Hence definite advice and information can now be obtained from any patent agent by those whose patents or applications are in any way affected. H. THOMPSON, *Secretary.*

London, W.C.1, *October 26th.*

The Cannock Undertaking's Accounts

Kindly allow me to draw your attention to an error in the figures given for this undertaking under the above heading in the current issue of the ELECTRICAL REVIEW.

Under the heading of "Profit or Loss," you show a loss of £568 for the year 1931, and a loss of £618 for the year 1932, whereas the actual figures were a profit of £798 for the year 1931, and a loss of £50 for the year 1932. The figures you have given represent the deficiency carried forward on the net revenue account, and are not the correct ones to use.

The difference between the two figures given for deficiency carried forward is £50 4s. 6d., which was the actual loss for the year ended March 31st, 1932. P. WARDLE,

Cannock, Staffs. *Chief Engineer and General Manager.*
October 29th. U.D.C. Electricity Dept.

Make the Connection

Further to my letter which appeared in your issue of October 14th, the following extract from "The Industrial Survey of South Wales made for the Board of Trade by the University College of South Wales and Monmouthshire" (Stationery Office, price 3s. 6d.) may also interest some of your readers.

On page 158 we read: "The industrial development of this region in the future must depend very much upon the facilities available to industry for the use of electric power. At present, as in the rest of the country, the situation is somewhat confused."

The next paragraph refers to the linking up of the power stations in this area under the provisions of the Electricity Supply Act, 1926, and the hope is expressed that many who now supply their own needs will be persuaded to purchase their electricity, thus facilitating large-scale production, which will greatly reduce costs. NATIONAL ECONOMY.

October 25th.

The Thames Grid Crossing

May I suggest that a suitable term for the two steel structures which carry the C.E.B. line across the Thames is "Thames props"? This expresses precisely their function, which is to prop the conductors over the river.

I have inspected one of the "props" at close quarters, and it is an impressive sight. I wish all the pessimists and those who are ever ready to disparage Britain in comparison with other countries could have a similar experience. It would hearten them and prove that this country is still second to none in its engineering achievements. H. C. C. C. SILVER.

Sanderstead, Surrey, *October 26th.*

Dear Coal and Cheap Electricity

In the Lancashire and Cheshire area the Executive Board under the Coal Mines Act has decreed that for the same coal public utility undertakings shall pay a higher price than industry. I wrote to the Minister of Mines in connection with this and have received from him a letter which seems to indicate that under the Coal Mines Act a District Executive Board can determine what prices are to be paid in their area.

The Government in its anxiety to assist industry passed the Derating Act, by which public utility undertakings are precluded from any benefit; now we have the Government passing the Coal Mines Act which gives the District Executive Board power to fix prices, and not only minimum prices, and we have a Government body (the Central Electricity Board) established to provide the country with cheap electricity. Further, the Government has suggested a tariff on copper which will increase the cost of apparatus and machinery to be used for electrical purposes. Politics does not seem to have helped the electrical industry much so far. T. A. KERR,

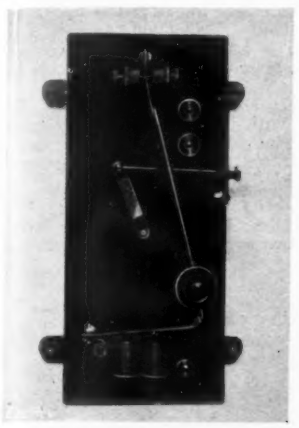
Trafford Park, Manchester. *Electrical Engineer,*
November 1st. Stretford & District Electricity Board.

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

A Time Switch for Burglar Alarms

In September an L.C.C. bylaw came into force imposing a fine of £5 on people allowing burglar alarms to ring for more than ten minutes, or five minutes if the building is situated in the Administrative County of London. The "Wemco" time switch, which is easily applicable to burglar alarms, has been developed by WALTER'S ELECTRICAL MFG. CO., LTD., Kensaltown Works, Kensal Road, W.10. It is very simple in action and consists of a steel box measuring 9½ in. by 4½ in. by 2 in., in which is an electromagnet. When this magnet is energised it releases a calibrated pendulum which can be timed to swing for between five and fifteen minutes. At each swing of the pendulum, contact is made against a very fine spring fitted with a platinum contact, but when the pendulum hangs vertically without moving the contact is broken and the bell ceases ringing.



The "Wemco" burglar alarm time switch

The price of the apparatus is £3, and for an extra 15s. a lamp can be provided which glows while the bell is ringing and until the switch is reset. Incidentally, should the burglar attempt to reset the time switch while it is ringing he will only cause it to ring continuously and indefinitely.

A Safety Switch-plug

The new "G.M." safety switch-plug for a.c. supplies is a product of the G.M. PLUG MANUFACTURING CO., and is sold by MR. F. G. KETELBY, Worcester Chambers, 14, New Street, Birmingham. The input to the plug can be up to 250 V and a 50, 60 or 100-W transformer reduces the supply pressure to 25 V. The primary winding is d.s.c. and the secondary d.c.c., impregnated and tested up to 3,000 V for one minute. An earth shield is fitted between the primary and the secondary, and the safety plug is suitable for handlamps, small tools, &c.; it is used by the Birmingham Corporation. The 60-W size costs £2 7s. 6d.

The "G.M." safety switch-plug

An Automatic Contactor Starter

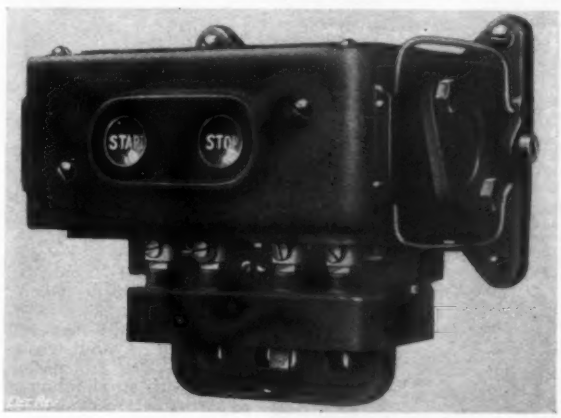
The "SC.O" automatic contactor starter is intended for use with small squirrel-cage induction motors with a maximum h.p. of 7½ at 550 V. It can be used as an oil-immersed or air-break starter or as a circuit-breaker for local or remote control.

Low-voltage protection is provided and with push-button control the motor cannot restart itself; where 2-wire control is used the motor will start automatically. The overload protection is of the thermal self-resetting type in two phases only (hand resetting types are available in two or three phases). The overload is designed to act in 0.06 second on a short-circuit with about forty-five times the normal current.

The 4-pole contactor switch has a vertical double-break per pole, the fourth pole serving the operating coil circuit. The stationary contacts are faced with silver, and the phases are separated by arc shields.

The operating magnet comprises a laminated magnet with shading coil, and the armature carries an insulated moulding, on to which are assembled silver-tipped wiping action contacts. The operating coil is continuously rated, and capable of closing the contactor on a line voltage 20 per cent. below normal.

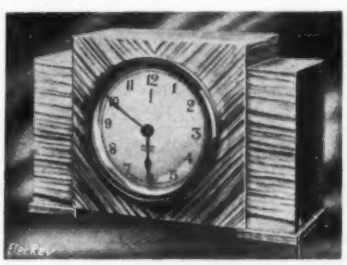
The main body is of cast-iron and the pressed-steel top and bottom covers are held in position by spring clips. The "PBO" "start" and "stop" push-buttons are totally enclosed in moulded insulation, the projections through the front being shrouded. The main terminals are of the clamp type and easily accessible, while as a standard a dished clamp with "knock-out" is fitted over each cable entry. Various forms of cable glands can be provided for the line cable, and cables up to 7/.036 in., 3-core, v.i.r., taped, braided and compounded, or its equivalents can be accommodated. The complete starter measures 5¾ in. high by 6 in. wide by 5½ in. deep, and is made at Brighton by MESSRS. ALLEN WEST & CO., LTD.



The "SC.O" automatic starter

Radio Clocks

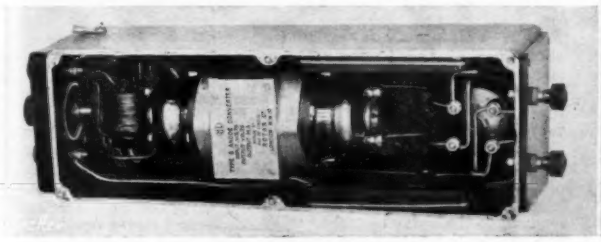
The JUNIT MANUFACTURING CO., LTD., Junit Works, Steele Road, Acton Lane, W.4, is introducing a variety of attractive cases for its synchronous electric clock for use with a.c. wireless sets and radio gramophones. Special models are designed to match the design of the sets and carried out in similar materials and graining to the cabinets. The model illustrated is designed to match the Pye "K" receiver, and the price is 42s.



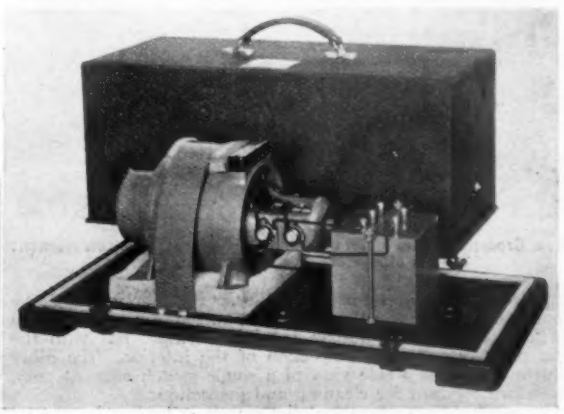
A "Junit" radio clock

The "M-L" Anode Convertors

When the house lighting supply is changed over from d.c. to a.c. it will often be found cheaper to use a convertor instead of entirely redesigning the wireless receiver. ROTAX, LTD., Willesden Junction, N.W.10, produces "anode convertors" for



The "M-L" anode convertor



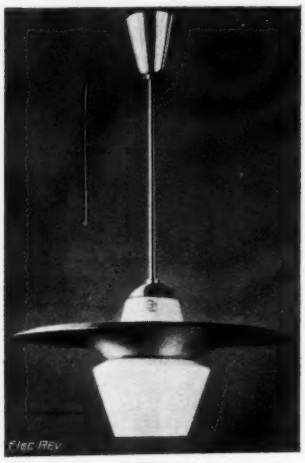
The "M-L" 200-W rotary transformer

this purpose and has just introduced a new type which can be used with short-wave sets as well as with those designed to operate on the medium and long-wave band. This convertor will give a constant output of 24 mA at 140 V with inputs varying from 6V to 100 V, and therefore one large 6-V accumulator can be used to provide energy for both h.t. and l.t. The weight is 14 lb., and the overall dimensions are 17 in. by 5 in. by 5 in. It costs £13 10s., and has been specially designed for use with the "Gecophone" all-wave superheterodyne six-valve receiver. Incidentally, grid bias tappings at 1½ and 9 V are also provided.

The same company is also supplying a range of rotary transformers for operating a.c. radio receivers from d.c. mains.

A Novel Lighting Fitting

The latest development by the KANDEM ELECTRICAL, LTD., 711, Fulham Road, S.W.6, is the "Reflect-o'-lite" diffusing unit. This unusual design incorporates a diffusing globe of special shape half way down on which rests a shaped and highly polished reflector. This causes the main light to be diffused and reflected downwards and sideways, while a portion of the light is diffused and reflected upwards, giving a high degree of efficiency. The globe itself is open at the bottom. The price of the whole fitting is 39s. 6d. nickel plated with an aluminium reflector. It can also be obtained in chromium nickel or colour finish according to requirements.



The "Reflect-o'-lite"

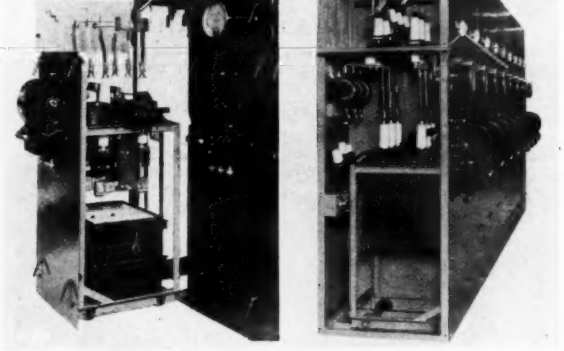
A New Use for a Time Switch

A difficulty that has been solved by electricity is that of providing light and heat on the Sabbath for those of the Jewish faith. Their rules of religious conduct forbid manual operations on that day, but, of course, place no ban upon the use of light and heat as such. VENNER TIME SWITCHES, LTD., Kingston By-pass, New Malden, Surrey, in conjunction with Mr. G. H. Stevens, 4, Bow Lane, E.C.4, who has carried out the installation work, have enabled comfort and convenience to be obtained while complying with the strictest tenets by the use of a time switch with its normal working reversed. Usually the time switch is required to cut off light on the day of rest, *e.g.*, for late shop-window lighting, but in the special adaptation under mention it performs its functions only on the Sabbath day.

Switchgear for Limited Spaces

An arrangement of switchgear, suitable for limited spaces, and providing complete accessibility to the oil switch, current transformers, and cable box, is being manufactured by MESSRS. CROMPTON PARKINSON, LTD., Bush House, W.C.2.

The apparatus illustrated was designed for use in a sub-station of insufficient depth for the usual design of truck gear. Ordinary cubicle pattern gear of the fixed type was not approved of owing to inaccessibility. The side view of the complete board shows the cable box, current transformers, oil switch, isolators and busbar panel in position, but with the end plate removed for inspection of the interior. The other illustration gives a side view of a single switch element only, as drawn forward for cleaning and inspection.



New Crompton-Parkinson switchgear; the single switch element and a side view of the complete board

To conduct this operation, the circuit is broken by the oil switch in the usual manner, and the isolators are then opened by means of the long handle projecting from the front of the cubicle. This handle is removable when not in use. The steel plate carrying the ammeter can then be unlatched and swung open on its hinges as shown, the ammeter leads being carried close to the hinge so as to reduce their movement to a minimum.

Clear access is thus given to the vertical links forming the main connections to the oil switch. These links can be unbolted and the switch truck unlatched and drawn forward on the rollers and axles shown in the base of the framework. The entire arrangement is completely interlocked, it being impossible to open the isolators unless the electrical circuit is already broken by the oil switch. Protection against the entry of vermin is assured by a totally enclosed escutcheon and the method adopted for operating the isolators from outside.

The complete apparatus offers all the advantages of the standard truck gear, together with the additional advantages accruing from a saving of about 50 per cent. of the space usually required for the withdrawal of standard truck gear.

"Ediswan" X-ray Reflectors

The EDISON SWAN ELECTRIC CO., LTD., 155, Charing Cross Road, W.C.2, is now making two new "X-ray" reflectors for shop window lighting which incorporate silver domes. Dimples inside the rim of the reflector enable colour frames and anti-glare shields to be snapped in position or removed instantly.

The "Duke" for 60/150-W lamps costs 17s. 6d., while the "Prince" for 100/200 W lamps is listed at one guinea (200-W model, £1 2s. 6d.) These two models are intended chiefly for extra deep windows; the "Duchess" and "Princess" are similar and sell at the same price, but are of a different shape, being designed for average windows. The anti-glare shields cost 6s. and 7s. 6d.

The "Duchess" reflector

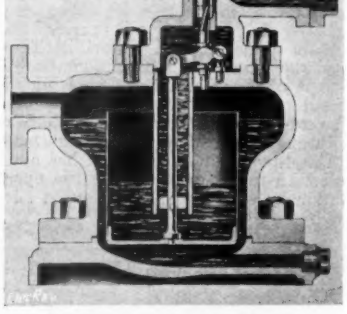
A Positive Steam Trap

It is hardly necessary to point out that the use of a cheap and shoddy steam trap is very bad policy, alike as regards loss of hot water and live steam, which applies just as much to the super-power station as to the smallest industrial establishment.

The latest design of the "Economic" steam trap, manufactured by STEAM PLANT ACCESSORIES, LTD., 38, Victoria Street, S.W.1, is of the high-duty bucket type. It is supplied in two types, one of which is for general industrial use with pressures up to 200 lb. per sq. in. (saturated steam), having a cast-iron body, bronze working parts, and nickel-alloy valve and seat; the discharge for the 1½ in. size allows of a discharge of 800 gal. of water per hour. The second type is for power stations (high pressure and superheated steam) with cast-steel body, monel-metal parts, and nickel alloy valve and seat; the capacity of the 1½-in. size is 600 gal. of water per hour.

Essentially the trap consists of a cast-iron or cast-steel body bolted to a base plate, with a bolted cover having a flanged outlet at the top for the discharge of the condensed water, while a flanged inlet connecting to the steam pipe is at the side, the whole constituting a heavy and substantial construction.

Inside is a large bucket having a vertical rod working in a bearing attached to the bottom, at the centre. This rod is connected at the top (see illustration) to a lever mechanism in a separate small valve chamber which actuates the nickel-alloy valve (fixed vertically inside the top of the chamber) controlling the outlet. Also suspended in the centre of the bucket, but never touching the bottom, is a vertical wide diameter stationary outlet pipe, through the centre of which the valve rod operates, connecting to the valve chamber. The condensed water first nearly fills the body of the trap and then flows over into the bucket. When this in turn is filled it sinks by its weight, and the



Vertical section through the "Economic" steam trap

attached rod and lever gear opens the outlet valve. Condensed water is then blown out of the bucket by the steam pressure through the control outlet pipe until the bucket is nearly empty, when it rises and closes the outlet valve.

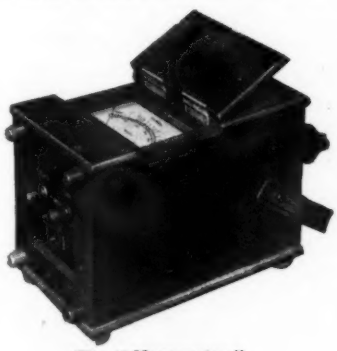
No constant dribbling of water takes place since the valve is always definitely closed or wide open. Entrapped air, one of the problems of efficient steam trap design, is eliminated.

A Guaranteed Car Battery

A new "Exide" car battery, carrying a two-years' unconditional guarantee, is announced by the CHLORIDE ELECTRICAL STORAGE CO., LTD., 219, Shaftesbury Avenue, W.C.2. Perforated ebonite sheets are used in addition to wood separators between the plates. These provide an additional armouring for the positive plates, thus increasing the life of the cells. The standard 85-Ah battery costs £2 15s.; the "Double Life" costs £4 5s., and prices of other types in the new range are in proportion.

An Insulation Testing Set

The "Megometer" insulation testing set is a product of the ELECTRICAL EQUIPMENT & CARBON CO., LTD., 107, New Oxford Street, W.C.1.



The "Megometer"

The meter registers 0-20 megohms at 500 V and as a 700-ohm voltmeter, 0-250 V and 0-500 V d.c. It has a constant voltage generator with a slipping clutch designed to give a steady reading regardless of the speed at which the handle is turned. The instrument is housed in a polished walnut case measuring 9 in. long by 5 in. wide by 6 in. high. The weight is 6¼ lb. and the price £11 10s. When working as a resistance tester on 250 V the readings should be halved. Carrying cases are available at 15s.

A Washing and Drying Machine

The new "Whirldry" washing machine marketed in this country by WATTAGE, LTD., Vintry House, Queen Street Place, E.C., at 25 guineas is a portable equipment which will wash, rinse, dry-clean, and dry without any need to touch the water or cleaning liquid by hand. It measures 18 in. high and 16¾ in. in diameter, weighs 37 lb., and has a clothes capacity of five men's shirts, a double sheet, or six bath towels.

In a vitreous enamelled (inside and out) upright cylindrical steel tank is a removable perforated aluminium spinner basket complete with a fixed agitator mounted over a tubular pedestal housing two concentric driving shafts. The outer shaft has an oscillating motion which is transmitted to the basket for washing, rinsing and dry-cleaning, while the inner shaft revolves uniformly, imparting a high speed to the basket for centrifugal extraction.

The gear mechanism is belt driven from a 1/15-h.p. universal motor bracketed horizontally under the tank. The belt drives a worm shaft with journalled bearings in the sides of the casing in which there are two worm gears, one driving a gear wheel on the lower end of the vertical driving shaft, the other meshing with a gear wheel carrying an eccentric which gives

The "Whirldry" washing machine

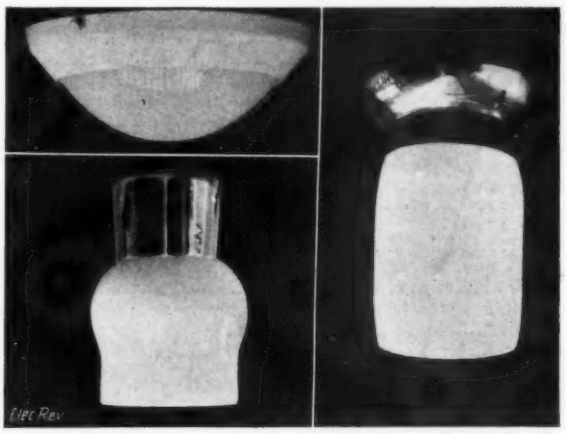
an oscillating motion to a toothed rack meshing with a segment on the lower end of the outer vertical shaft. The gears are all machine cut, and they run in oil in a single aluminium casing.

The machine is supplied with a length of 3-core c.t.s. flexible lead, and a switch for the motor is incorporated in the structure. A drain-away connection at the bottom of the tank is served by a suitable valve and a length of hose pipe. The price includes 4 gal. of special dry-cleaning fluid, two years' maintenance service, and three years' guarantee.

Modern Ceiling Fittings

Three new ceiling lighting fittings have been introduced by MESSRS. BEST & LLOYD, LTD., Cambray Works, Handsworth, Birmingham.

Model 30574, which is fitted with opal glass, takes a lamp up to 75 W and has a diameter of 10 in. with a depth of 4 in.; its price is £1 5s. No. 30656, made in flashed opal glass for



Best & Lloyd ceiling fittings, models 30574, 30656, and 30655

60-W lamps, has a depth of 7½ in. and diameter of 5½ in., and is priced at 10s. 6d. Model 30655 for 100-W lamps is 8¾ in. deep and 6½ in. in diameter and costs 18s.; it has opal glass and a base finished in brass.

High-voltage Radio Condensers

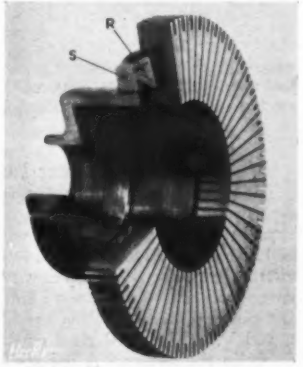
The TELEGRAPH CONDENSER CO., LTD., Wales Farm Road, North Acton, W.3, is believed to be one of the first manufacturers definitely to tackle the subject of condenser peak voltages by quoting actual figures.

The importance of this factor will be readily realised by users of modern mains-driven radio receivers. The T.C.C. type 87 range, which is tested to 1,500 V d.c., and is suitable for continuous working up to 400 V d.c., is designed to withstand peaks up to 650 V.

Considering the conditions for which they are suitable, constructors and manufacturers will find these paper-insulated condensers both efficient and competitive in price at 8s. for 4 mfd., 4s. 9d. for 2 mfd., and 3s. 8d. for 1 mfd. The first-mentioned is almost a 2-in. cube. Soldering terminal tags are provided, and the familiar green tin container case is fitted with perforated fixing feet.

A Face Commutator

The WATLIFF CO., LTD., 175, Merton Road, Wimbledon, S.W.19, has produced a face commutator of new design. The illustration shows the construction. The essential feature is the compound retaining ring consisting of a solid steel specially shaped ring R, which is used to expand the inner and outer walls of a second steel ring S, into the dovetail recess in the commutator segments. A layer of micanite insulation is provided for insulating the ring S from the segments. The ring S may be internally screwed or otherwise adapted to take a housing for a short circuiting device when used for repulsion induction motors, or any desired form of centre mounting may be easily added.



A "Watliff" face commutator

Owing to the large expanding pressures which can be obtained with this construction, the insulation is perfectly bedded down, and the whole compound retaining ring becomes a solid steel ring filling the entire space in the recess. The resulting commutator is claimed to be nearly indestructible, the segments being so rigidly held that they cannot be displaced, even with severe hammer blows. The capacity to withstand stresses due to high rotational speeds is claimed to be superior to other types of commutator, since the segments have the minimum possible weight and are effectively prevented from bursting by the retaining ring. This is the equivalent of the "shrink ring" commonly used on high speed turbo-generator commutators. The commutator is able to withstand high temperatures without loosening or distortion of the segments.

With this type of construction greatly increased winding space is available behind the commutator, and the space occupied by the projection of the mounting behind the segments can be made extremely small.

Some Recent "English Electric" Developments

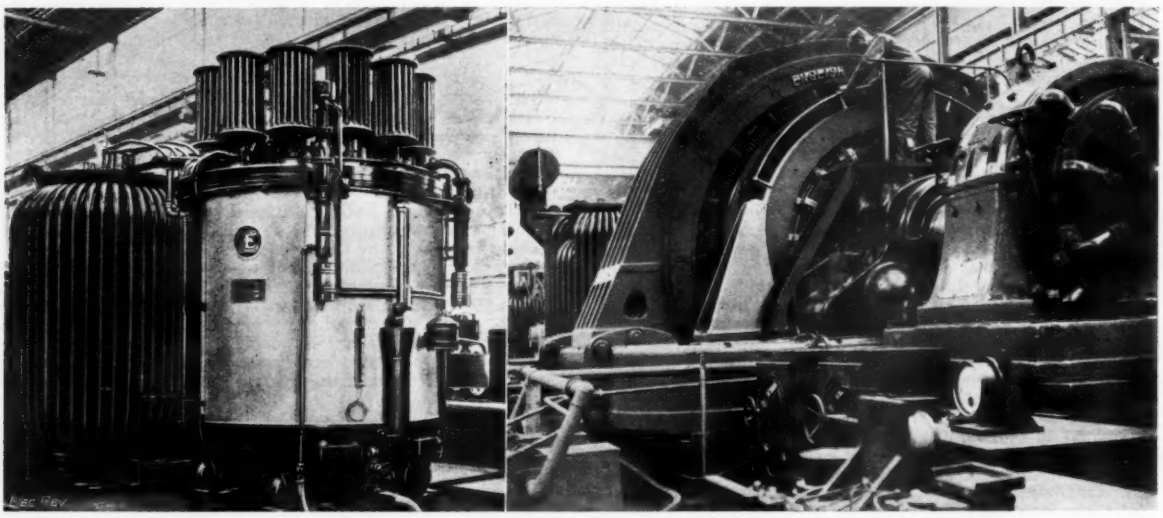
Notable items seen at the Stafford works

EXAMPLES of the more recent products of the English Electric Co., Ltd., were seen this week at Stafford.

Grid control is the essential feature of the company's steel-tank mercury-arc rectifiers. Placed between the anodes and the cathode, the grids afford control of the phase point in the anode voltage cycle at which the arc discharge commences; once an arc is established the grid exerts no influence, and current continues to flow until the anode voltage falls to zero. The current may be interrupted on the d.c. side without mechanical means. If a negative potential is suddenly applied to all the grids, the arc can no longer commence to pass from any anode, the normal commutation of the arc from anode to anode ceases, and the rectifier becomes its own circuit breaker.

The principles, construction and operating characteristics of the controlled grid rectifier were described in an article in the ELECTRICAL REVIEW of December 25th, 1931. Its scope includes inversion of d.c. to a.c., static frequency changing, and the interconnections of three-phase systems. 30,000 V has been obtained from a single mercury-arc rectifier, and it is not unlikely that rectifier units operating at 100,000 V d.c. will be developed commercially during the next few years.

In collaboration with the Whessoe Foundry and Engineering Co., Ltd., the English Electric Co. has designed dynamos suitable for pressures of up to 45,000 V. The generating unit for a typical equipment supplying 0.15 A at from 40 to 45 kV would consist of a driving motor coupled to three generators connected in series, with their frames insulated from earth and their shafts insulated from each other. Each generator has two h.p. windings connected to separate commutators connected in series with an intermediate connection to the frame at the mid-potential point.



(Left) A heavy-duty rectifier rated at 2,200 kW, 4,000 A. (Right) An 18,000-h.p. reversing-mill motor

Switchgear Improvements

The company has recently applied the "Deion" contact system to large oil breakers, including a 132,000-V outdoor-type breaker for the C.E.B. with a rated rupturing capacity of 1,500,000 kVA. The company has produced a light metalclad circuit breaker with drop-down isolation suitable where floor space is limited and access cannot be obtained to the back of the pillars; standard sizes are rated at 200, 400 and 600 A for 11,000 V. Fabricated steel construction has been used extensively in the design. A 100-A, 12,000-V oil circuit-breaker unit with "thermal-trip" protection has been developed to meet the demand for an economical substitute for the switch-fuse which will disconnect all three phases on the occurrence of a heavy overload on any one phase. The three bars are mechanically connected, and a thermal tripping element is fitted on the moving cross-bar of each phase, and the operation of any element will trip the complete breaker.

The tripping element comprises a bimetal unit of suitable section for the normal current, a bimetal compensating strip, and short-circuiting contacts for the trip elements, to short-circuit them after they have tripped, and thus protect them from damage on a severe fault. The complete moving portion can be lifted vertically through the cover for examination or alteration of the tripping elements by mechanism interlocked with the switch operating handle. A high-speed current limiter (Branchu system) for protecting feeders and sub-station plant, particularly on d.c. heavy traction systems, against severe short circuits was inspected. The small mass of the moving parts and the absence of large control forces produced by heavy springs give rapid operation, and consequently a clean break with little deterioration of the contacts. The principal parts are a magnetic system having an exciting winding connected in the load circuit, a main contact of the roller type connected in the load circuit in series with the main energising coil, and a sliding contact bar forming part of a short-circuited turn surrounding the core of the main magnetic circuit.

The main roller contact is coupled mechanically to the sliding contact bar and is held in the closed position by a light adjustable spring secured to the frame of the limiter.

Diesel-electric Traction

We saw a 200-h.p., 1,500-r.p.m. self-contained Diesel-electric traction combination. It is of the airless-injection four-stroke cycle type, and is fitted with Bosch fuel pumps and injectors. The fuel consumption is 0.38 and 0.40 lb. per b.h.p. per hour at full load and three-quarter load, respectively. The lower half of the crank case, which forms the bedplate, is of fabricated steel, and the upper half is of cast steel. The pistons are of aluminium alloy.

The generator is a 870-V separately excited decompounded machine with a B.S.I. continuous rating of 135 kW. Three-point support is adopted. The two transverse bearings at the generator end are designed as trunnions, whilst the support at the engine end has provision for sliding and thus taking up movement due to expansion and contraction.

Included in the equipment for an important South African contract is an 18,000 h.p. (peak 80 r.p.m.) reversing-mill motor with a speed variation from zero to plus and minus 180 r.p.m. It is of the single-armature forced-ventilated type, and is supplied from a flywheel motor-generator set which has an induction motor of 4,200 h.p., three generators of 1,455 kW normal output each, and a flywheel of 160,000 h.p.-seconds, all rigidly coupled together and running at a maximum speed of 600 r.p.m. The three generators are connected in series to give a maximum of 1,440 V.

The motor will drive a three-stand reversing mill with cogging, roughing and finishing housings for dealing with 2-ton ingots and turning out billets, various merchant bars, rails, &c.

Informing the Consumer

"The Case for Electricity" is a thoroughly practical and informative booklet written by Mrs. E. E. Edwards and published by the E.A.W. at 3d. for the benefit of consumers in rural areas. In addition to the costs of electricity under different conditions of working, a range of prices of domestic apparatus is given with hints on their use. The rights of the public in demanding a supply are dealt with in a brief article that sets out clearly the statutory obligations of supply undertakings towards their consumers.

A "Private View" of the Building Centre

ONE of the most representative electrical gatherings within our recollection attended the Building Centre, 158, New Bond Street, W., on Thursday last week to inspect it and give it a magnificent "send-off." The leaders of every branch of the industry were present at the invitation of the British Electrical Development Association, a list of whom would be something of an electrical "Who's Who." There was also a goodly sprinkling of architects.

A luncheon was held at the May Fair Hotel at which Lord Meston, the President of E.D.A., took the chair. The toast of "The Building Centre," was proposed by Sir Hugo Hirst, Bt., who recalled the early days of electricity when lighting was practically its only application. He said that at that time they vainly sought the co-operation of the architect in putting in installations and had to do their work when the building was completed, with not altogether satisfactory results. Now the time had come when people were demanding full electrical service and the collaboration of the architect had become most desirable and necessary. He congratulated Messrs. A. C. Cramb (director and secretary), V. W. Dale (business manager), of E.D.A., and Mr. F. W. Maitland, of E.L.M.A., upon the successful results of their work, and expressed the hope that architects would make full use of the Centre in the education of their clients.

An Appeal for Continued Co-operation

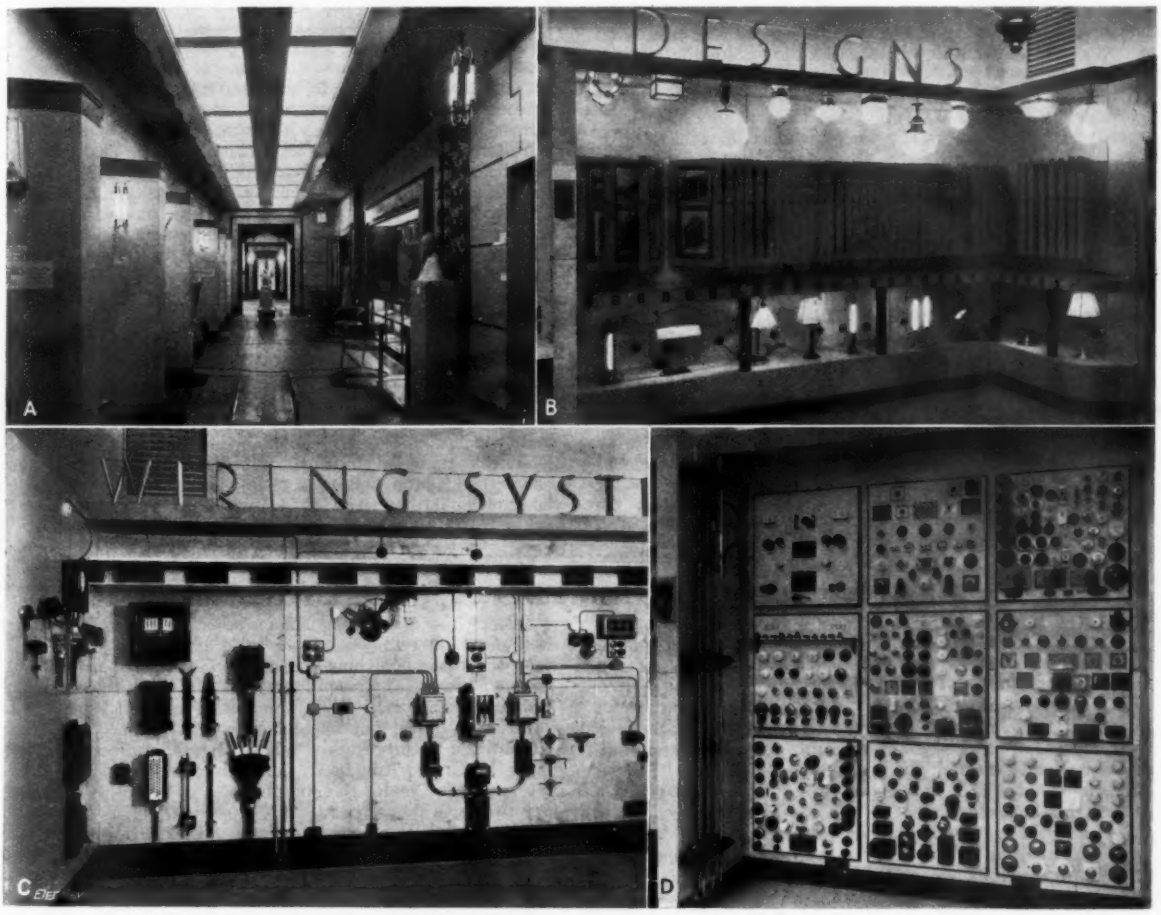
Mr. Maurice E. Webb, F.R.I.B.A., Chairman of the Centre, thanked the whole of the electrical industry for its unstinted support, and especially Sir Hugo Hirst, who had aroused the interest of the industry in the Centre, and Mr. H. T. Young, who had been responsible for the lighting. Already the Centre was receiving requests from all over the world for help and advice. It was their intention to walk before they ran and not set up centres in the provinces or elsewhere until the success of the London Centre had been proved. Such a movement as this required continued and increasing co-operation and he appealed for all the help that the electrical industry could give. They had arranged with the King Edward's Hospital Fund authorities to exhibit a fully equipped model hospital for a month and during that period they wanted to make a display of everything connected with hospitals; they asked manufacturers of appropriate equipment to assist them in this matter. In conclusion Mr. Webb mentioned that Mr. Yerbury had been appointed managing director of the Centre.

Sir Raymond Unwin, President R.I.B.A., proposing the toast of "The Electrical Industry," said that that industry had shown an example of the supreme power of co-operation and this explained a great deal of its success. It had spread over the whole world the benefits of one of the most remarkable advances of our time. By enlightened handling of this great new power the industry had flooded our homes and factories with light.

The Right Kind of Advertising

He confessed that he did not appreciate the ordinary type of advertising which sought to make one purchase one maker's goods rather than another's, but the Centre provided an example of the kind of advertising which did nothing but good. It showed the visitor what was the best way to do a job and how to get it done. The Centre represented an attempt of the building industry to overcome the creeping paralysis which seemed to be over the country; increased effort was the only way out. No good could come of the stifling of building activity.

Lord Meston, in reply, said that the history of civilisation was a constant adaptation of industry to art. This movement had been more rapid in electricity than in anything which had gone before. The Building Centre was a definite endeavour to show the world at large how electrical science could join hands with the older domestic arts. They believed that the Centre marked an important stage in the combination of the useful and the beautiful.



Decoration and Utility at the Building Centre

A. Trough lighting in the ceiling of the ground floor. B. The lighting fittings and designs section. C. Examples of cabling and wiring systems. D. Switches, plugs and other installation accessories

Quarries and Metalliferous Mines

The Annual Report of H.M. Chief Inspector of Mines on the Quarrying and Metalliferous Mining Industries during 1931 deals primarily with questions relating to the health and safety of workers in and about metalliferous mines and quarries, but also contains information about employment, output and value of minerals, use of explosives and electricity, &c. The chapters on accidents and their prevention are the main features. These chapters contain a review of the chief causes of accidents, with examples from each of the divisions and the suggestions of the divisional inspectors as to ways in which similar accidents may be prevented in the future.

The Report is published by the Stationery Office at the reduced price of 9d. (post free 10d.).

What the B.E.A.M.A. Thinks of Ottawa

We have received the following statement from the Economic and Statistical Department of the British Electrical and Allied Manufacturers' Association:—

FROM a narrowly financial point of view, the Association frankly admits that the hopes of the United Kingdom electrical manufacturer were only incompletely realised. The preferences given in certain cases give little relief to him and in other cases relief which was expected was not granted. But none the less, the Association believes that the preferences extended do constitute a definite improvement on the situation obtaining before the Conference.

A calculation based on the figures for United Kingdom exports to the signatory Dominions, indicates that from the agreements will be derived a net gain made up in part of actual savings on duties paid against foreign countries. That gain amounts to a maximum of £140,000 per annum if we take as basis the export figures for Canada, New Zealand, South Africa, India, Australia and Southern Rhodesia, for the lean year of 1931, or of £185,000 if we take the figures for the average of the three years 1929-31.

When one considers that in 1931 the total export to the six Dominions was £3,650,000, the gain does not appear to be a very substantial one, even if we remember that the British share in the imports into India, South Africa and New Zealand was over fifty per cent. and the Association does feel that in certain respects the legitimate claims of the British industry have not been met.

An Optimistic View

If the net result is on the whole rather small, though none the less welcome, the Association feels bound to take an optimistic view of the results of Ottawa. It is, it considers, unfair to judge these solely on a purely net cash basis, obtained from the trade figures of previous years. The general effect of the agreements is to increase very considerably the purchasing power of the Dominions by the preference granted to their raw materials by the United Kingdom. That increase, the Association is confident, is bound to affect beneficially the United Kingdom electrical trade. Further, the general trend of the Ottawa results is in the direction of greater co-operation between the Dominions and this country; the atmosphere has become distinctly more cordial and in such an improved atmosphere the United Kingdom manufacturers will have a greater chance of obtaining business than before.

In this connection the Association notes with satisfaction that the apprehension originally felt very acutely in the electrical industry regarding the effect on production costs of the duties to be imposed by this country on certain raw materials in favour of Dominion producers has to some extent not been justified. In the case of copper, the difficulties regarding supply and price were at once adjusted at the Conference between producers and consumers. In regard to lead and zinc, the pledge of the United Kingdom Government that the duties will be removed if there is any unjustified raising of prices has not yet been fulfilled. It is hoped that a method of procedure will be speedily found to safeguard the interests of consumers as in the case of copper.

Imperial Economic Unity

At Ottawa, the Association is glad to note, the Conference refused to confine itself merely to questions of tariff readjustment, but viewed its mission as one of ensuring greater Imperial economic unity. To that end the Conference reached agreement on certain principles of co-operation which should form a basis on which such unity may be established. These were formulated in a series of resolutions which dealt with the establishment of a standard of Empire content, with the need for withdrawal of export bounties and anti-dumping duties, and for reform of customs administrations, and with methods of economic co-operation and industrial standardisation.

These resolutions the Association heartily welcomes and is confident that the Governments concerned will realise the desirability of giving effect to them at the earliest opportunity. It welcomes also the proposal to establish tariff boards in the Dominions to deal with any difficulties that may arise in the carrying out of the tariff agreements. Such boards can, it is sure, contribute greatly to inter-Imperial trade if their work is done without reference to political considerations and with the ideal of greater Imperial economic unity clearly before them.

In conclusion, the Association believes that the Conference offers a genuine Imperial opportunity of which the fullest use should be made in a spirit of good will and co-operation, and it has no doubt that the United Kingdom electrical industry is ready to do its part towards that end.

The New Zealand Domestic Appliance Market

THE opinion that United Kingdom manufacturers tend to put too much work into the inside and not enough on the outside of domestic electrical appliances is expressed in a recent Department of Overseas Trade report relating to the New Zealand market. Foreign products generally arrive in New Zealand before the British-made articles, and make a deep impression on the public, retaining their hold largely by superior advertising and packing methods.

There is not much prospect of a general growth in the demand for domestic appliances, as the electricity boom has passed and the market is unlikely to increase. The domestic use of electricity in New Zealand is much more developed than in the United Kingdom, and there are no building schemes of any importance being carried out nowadays.

Growth of Local Manufacturing

Local manufacturers are making a strong bid for the market, and British manufacturers are placed at a disadvantage by reason of the import duties. It is, however, possible for United Kingdom manufacturers to obtain a larger share of the trade. In most cases there is already available a British-made article as good as, or better than, that made elsewhere, but which is not so well known. It is suggested that "manufacturers should inspire their agents (who usually handle foreign goods as well) with enthusiasm for the British article to such an extent that they must impart some of their enthusiasm to the distributors."

Dealing individually with domestic appliances, the report states that there is only one competitive British-made cooker on the New Zealand market, and the competition lies entirely between United Kingdom, Canadian and locally made ranges. Taking into account freight, tariff and exchange charges, locally made ranges have an advantage of at least 60 per cent., but while some of them are satisfactory they are not equal to imported articles even when they are as expensive.

Criticisms levelled against British-made cookers are various. As a general rule they are rather high in price and it is said that they are too heavy, being really an adaptation of the gas stove. The electrical cooker developed from the gas stove has not the attractive appearance of the lighter Canadian article.

Purchasers of cookers fall into three classes:—(1) Power Boards (these account for most of the sales made, but the prices obtainable are considerably lower than retail prices), (2) builders (lack of building has curtailed activity in this direction), and (3) retailers (whose sales are small).

In the past small bowl radiators of American manufacture have sold well, but recently several United Kingdom makes have overcome practically all opposition and can be said to be superior in price, quality and appearance. Larger radiators of from one to three kilowatts have always been bought chiefly from the United Kingdom. Competition from the local industry is growing under the stimulus of a 25 per cent. advantage due to the Customs tariff.

Domestic water-heating apparatus is almost invariably made locally, and British firms could not compete so far as the large copper cylinders are concerned. Some smaller British apparatus is imported.

Considerable quantities of vacuum cleaners are imported from Canada, Sweden, and the United States, but comparatively few from the United Kingdom. There appear to be suitable cleaners of British make available, but it will be necessary to expend some energy on a campaign to make them known if they are to obtain their fair share of the market.

Washing machines are increasing in popularity but the market is held by Canadian and United States manufacturers. Canadian and American irons also have dominated the market, but agents for British irons have been able to capture a good portion of the trade by their ability to quote lower prices. Kettles of United Kingdom make are mostly used, but British toasters are not very well known.

A Comparison of Imports

Below is given a comparison of the domestic appliance imports for 1930 and 1931:—

	1930. £	1931. £
Electric fires, radiators, water heaters, irons, kettles, toasters, etc.—		
Total	135,199	68,009
From United Kingdom	39,871	39,045
,, Canada	12,096	4,070
,, Australia	9,908	9,117
,, United States	42,821	10,289
Electric cookers—		
Total	53,114	21,470
From United Kingdom	2,605	3,193
,, Canada	49,706	18,266
Vacuum cleaners—		
Total	44,046	24,794
From United Kingdom	5,130	1,729
,, Canada	19,787	4,844
,, Sweden	11,554	13,362
,, United States	6,058	4,551

Parliamentary News (BY OUR SPECIAL REPORTER)

ON October 27th the House of Commons carried the second reading of the Ottawa Agreements Bill. Most of the time of Parliament during the remaining part of this Session will be devoted to the consideration of this legislation. The Bill has to become law before November 15th, the date on which the preferences given to the Dominions under the Import Duties Act expires.

Mr. Runciman, the President of the Board of Trade, winding up the debate on the second reading on October 27th, referred to the position of copper. No subject, he said, had caused more trouble, and it was felt as well for the Empire to be able to obtain all that was required from within the Empire. They did not wish to be at the mercy of those who could open the door of supply or cut it off just as suited their interests. They had accordingly recommended a duty of 2d. per lb. on raw copper. That duty was almost prohibitive, and they only put it on because they knew that within the boundaries of the Empire there was sufficient copper to satisfy all their needs. They only agreed to the duty on the understanding that the consumers and producers arrived at a common agreement.

It had been agreed to set up a joint committee whose first duty it would be to report to the Government, not later than November 5th, as to the availability of supplies of Empire electrolytic copper, and in the light of that report the Government would decide when the duty on that variety of copper would be imposed. The signatories to the agreement asked the Government to abstain for the present from imposing the duty on copper other than electrolytic copper, but it was understood that the duty would be imposed on those forms of copper as soon as Empire producers could supply adequate quantities and qualities.

Battery Lamps for Pit Ponies

On October 24th, Sir Robert Gower asked the Secretary for Mines whether he had had further reports with regard to the utility of the experimental electric-battery lamps fixed to the harness of the horses below ground; whether those lamps enabled the horses to work with greater confidence and tended to reduce the liability to accidents; and whether he hoped to be able to issue recommendations as to their more general adoption in the near future.

Mr. E. Brown said three types of pony lamps had been approved as safe for use in mines and a fourth type was about to be approved. The Inspectors of Mines were using their influence to encourage the more extended trial of the lamps, but further practical experience was necessary before it could be decided how far their general adoption would be desirable. The reports so far received, however, were favourable to the view that such lamps might assist in the reduction of accidents both to horses and drivers.

The Grampian Scheme

On October 26th Lord Scone asked the Minister of Transport if he was aware that the inhabitants of Errol, on the strength of promises made to them by the Grampian Electricity Company, scrapped the gas fittings of their houses and wired them for electric light, which the company had failed to provide, thus leaving the village deprived of all artificial illuminant at the beginning of winter; what steps he proposed to take to compel the company to fulfil its obligations, and if he would insist on the immediate reference to an independent arbiter of the matter in dispute between the Grampian Electricity Company and small proprietors in the Errol neighbourhood, with a view to hastening the installation of electricity there.

Lieut-Col. Headlam, who replied, said that the company stated that the delay in affording a supply of electricity to Errol was due entirely to protracted and unsuccessful wayleave negotiations in respect of a short portion only of the necessary transmission line. They recently applied to him for the appointment of an arbiter to determine certain differences as to the compensation payable in respect of the erection of certain lines to which he had given his consent. While he had power under the Electricity (Supply) Acts to appoint an arbiter on a proper application being made, he was advised that he was not in a position to require immediate reference of the matter in dispute to arbitration. He had informed the company accordingly and it would consider forthwith the appropriate further procedure.

Telegraph Service Losses

On October 26th Mr. Denman asked the Postmaster-General whether his attention had been called to repeated comments of the Public Accounts Committee on the loss on the Telegraph Service, and whether he proposed to take steps to place it on a remunerative basis.

Mr. E. Bennett, Assistant Postmaster-General, said that many steps had been taken to improve the financial position of the Telegraph Service by the introduction and standardisation of teleprinter apparatus, by readjustment in the apportionment to telegraphs of certain common service staff costs, and by a closer adjustment of staff to traffic. The loss had been reduced from £1,380,000 in 1927-28 to about £828,000 in 1932-33. Further economies were anticipated as soon as present schemes had been completed, and the recommendations suggested by Lord Bridgeman's Committee, which were on the lines that had already been adopted, would also be carefully examined, but the Postmaster-General could not hold out any prospect of making the service remunerative until there was a material increase in the traffic and revenue.

The Severn Barrage

On October 27th Mr. L. Smith asked the Minister of Transport if he could state what had been the complete cost of the Severn Barrage investigation since its inception.

Mr. Pybus said that the cost to the present date was approximately £50,000, of which about £27,000 represented an appropriation in aid of Admiralty Votes.

London Passenger Transport

On October 27th the House of Commons agreed to a resolution carrying over the London Passenger Transport Bill to the next Session of Parliament.

Legal

An Electricity Supply Company Fined

At the Exmouth Police Court last week the Exe Valley Electricity Company was summoned for neglecting to observe Regulation 18(*d*) (1) made under the Factory and Workshop Act, 1901, as a consequence of which an employé named Bushin received a fatal shock in August last. The company pleaded "Guilty."

Mr. C. R. Palin, who appeared for the Director of Public Prosecutions, said that the deceased man was one of a party engaged in making alterations in a sub-station. The men were warned to take certain precautions, and the plant was made "dead" section by section to enable the work to be carried out. While Bushin was at the top of a ladder working on a "dead" section he came into proximity with some of the "live" mechanism. He was badly burned and died of his injuries and shock the same day. Mr. Palin said that it was the company's duty to erect screens between the "live" and "dead" sections, but this had not been done.

Mr. H. C. Michelmore, for the company, said that the accident had happened through Bushin deliberately crossing a gap of five or six feet from the side where he and his mates had been working in perfect safety for two hours. To make the switchboard entirely "dead" the company would have had to cut off the supply throughout East Devon. If the man had kept to his side nothing would have happened. Every precaution had been taken to make that part safe where the men were working, but screens could not be employed in the sub-station as constructed. Although the company had pleaded "Guilty," it was submitted that the engineer (Mr. McGuire) and the charge hand were justified in thinking that there was no danger in what they had done.

The presiding magistrate said the company had pleaded "Guilty," and would be fined £25, with costs amounting to 15 guineas. He added that the Bench would like to feel that the same thing would not happen again. They did not say there was carelessness, but it would be some protection to the public to know precautions would be taken to ensure that such a thing should not happen again. After a consultation with a director of the company Mr. Michelmore stated that no work would be done in future without the switchboard being made "dead," arrangements having been made to obtain supplies of electricity from another source.

A Price-cutting Action

In the King's Bench Division on October 26th, Mr. Justice McCardie heard an application by Regentone, Ltd., and the Regent Supply Co., Holborn Circus, E.C., for judgment against Super Radio (Lancs), Ltd., in default of appearance.

The plaintiffs asked for an injunction restraining the defendants from selling or advertising the sale of products of the plaintiffs at less than the list prices. It was stated that the defendants had advertised the products of the plaintiffs at 30 per cent. less than the plaintiffs' list prices.

His Lordship granted the application and directed that the damages should be assessed by a Master.

A Belgian Company's Bonds

Mr. Justice Farwell, in the Chancery Division, has given judgment on a summons taken out by Mr. Josiah Feist, of Wimbledon Park, S.W., the holder of a bond, part of an issue of £500,000 35-year sinking fund 3½ per cent. sterling bonds issued in September, 1928, by the Société Intercommunale Belge d'Electricité of Brussels, for the purpose of having it decided whether the covenant in the bond meant that the payment of principal and interest was to be in gold coin of the United Kingdom of, or equal to, the standard of weight and fineness existing on September 1st, 1928, as Mr. Feist contended, or whether, as it was claimed on behalf of the company, the payment could be satisfied by the tender of that which the law of England regarded as legal tender.

Mr. Justice Farwell held that the company's view was the correct one and granted a declaration to that effect.

Business and Industrial Notes

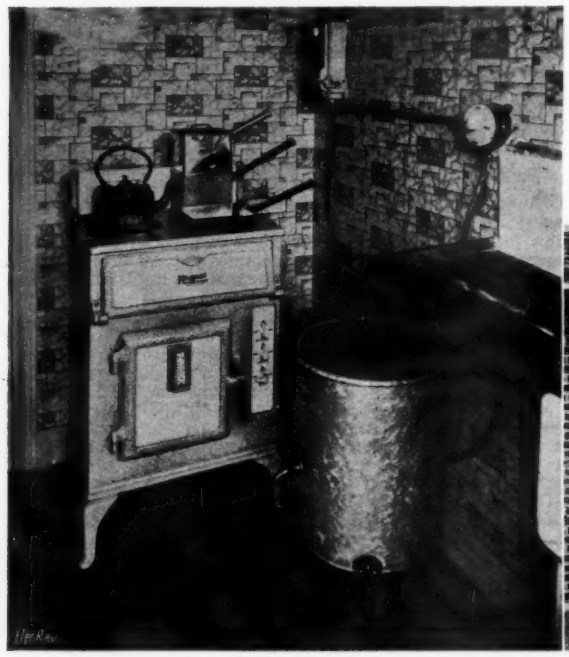
The Week's Electrical Trade News from all Sources, Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

New F.M.S. Duties

New and revised customs duties were enforced in the Federated Malay States on October 14th. Among the articles affected are batteries for electric torches or hand lamps (previously free of duty), on which there is now a preferential rate of 5 per cent. *ad valorem* to the British Empire, and a full tariff of 20 per cent. *ad valorem*. For all other electric lamps, the full tariff is 15 per cent. *ad valorem*, British Empire products being admitted duty free.

All-electric Houses at Hove

An exhibition all-electric house on the Aldrington Manor Estate, Hove, was opened by the Mayor of Hove (Councillor E. J. J. Thompson, J.P.) recently. Already several houses on this estate—which, when completed, will embrace about 160 houses—have been all-electrically equipped by Messrs. Galliers, Ltd., of Brighton and Hove. The accommodation of each house comprises three bedrooms, lounge, dining room, entrance hall, bathroom and kitchen. The show house contains an electric cooker and the hot water throughout the house is



The electric kitchen of the Hove All-Electric House and a group at the opening ceremony

heated electrically. Electric radiators are available for heating purposes, and the house has several power points conveniently installed for the purpose of connecting a sweeper, electric iron, &c. The General Electric Co., Ltd., supplied the electric lighting fittings, the "Magnet" cooker, water storage heater, and washboiler, as well as the switches, fuseboards, &c.

An A.M.A. Protest

The Accumulator Makers' Association has written to the Import Duties Advisory Committee stating that no effective steps have yet been taken to protect their industry from exploitation on the part of the monopoly controlling the supply in this country of Dominion-produced lead. The letter says that the industry is still having to pay whatever premium this monopoly cares to impose, while foreign competitors have a wide choice of alternative supplies at the London world prices. This represents a very serious handicap upon the export business in British-made accumulators. It is submitted that "the imposition of a premium by the suppliers of Dominions lead, whose interests the Government sought to promote by a duty on foreign lead, is an unscrupulous and serious exploitation of the lead users of this country," and that the only practical solution is to put lead on the free list. An amendment to the Tariff Bill in the House of Commons to put lead on the free list was withdrawn on a statement by the Chancellor of the Exchequer that the Government "did not intend to tolerate any undue exploitation of the consumer" and a promise that action would be taken if the threatened dangers of a premium arose.

It is also reported that the Association has pointed out that the Canadian "concession" on imported British accumulators is valueless. The Dominion stipulates that the plates shall exceed ¾ in. in thickness, a size which is never made.

The Association is stated to represent, on a basis of lead consumption, well over 95 per cent. of the accumulator industry of this country, using approximately 30,000 tons of lead per annum and directly employing some 4,000 persons.

It is reported by the *Financial Times* that "a big new concern is about to be formed, with resources at its command of a million sterling, for the purpose of entering the battery and accumulator, and, of course, the oxide, business in this country. . . . Lead, it is pointed out, has fallen about 70 per cent., with disastrous effects upon producers' profits, while those of manufacturers are thereby enhanced. It will be the policy of the new enterprise to keep its products at so low a price level as to stimulate consumption of the metal, which is being seriously affected by current charges for manufactured articles."

Local Exhibition

An exhibition of domestic electrical appliances was opened at the new offices of the Erith Urban District Council in Walnut Tree Road on Monday last.

A Furnace Demonstration at Sheffield

In co-operation with the Sheffield Corporation, Wild-Barfield Electric Furnaces, Ltd., is arranging a demonstration of the most modern types of electric heat-treatment furnaces at the Electricity Supply Department's Sheaf Street Works, Sheffield, from November 7th to 12th. The various furnaces will be in daily operation, the work and hardeners being supplied by prominent Sheffield manufacturers.

B.I.F. Travelling Facilities

Special travelling concessions have been announced by sixteen European countries to buyers proposing to attend the British Industries Fair in London and Birmingham next February, and railway fares to and from the Fair will be reduced by an average of one-fourth. The British railway companies, in addition to allowing Continental buyers to travel at single fare plus a third to and from London or Birmingham, have now agreed to make a valuable concession to visitors from the United Kingdom to trade fairs in Europe which are officially recognised by the Governments of the countries where they are held. Reduced fares are also announced over the majority of the passenger steamship services on the Scandinavian and Northern European routes, and buyers travelling by Imperial Airways, S.A.B.E.N.A. (Belgium), K.L.M. (Holland), and D.L.H. (Germany) will be granted reductions of 10 per cent. in their fares.

New Electricity Offices for Poplar

The Poplar Electricity Committee reports that it is desirable that the question of new offices for the central station should be dealt with in the near future, and has directed the borough electrical engineer to prepare a scheme for submission to the Council.

For Sale

Exhaust fans are offered for sale by the Harbour Pavilion (Morecambe), Ltd.

(See our advertisement pages to-day.)

Rationalisation in Japan

Schemes for the rationalisation of practically every branch of industry in Japan are reported by our Yokohama Correspondent. One proposal affecting the electrical machinery market concerns the control of the Shibaura, Fusi, Mitsubishi and Hitachi Works, while another scheme relates to the Japan

Electric, the Oki Electric, and the Adachi Electric Machine Companies. Upon the advice of the commercial and industrial authorities the Tokyo Electric Lamp Industrial Guild is taking steps to control the electric lamp industry, and various schemes of co-ordination are being drawn up. The establishment of a national federation of electric lamp manufacturers is considered probable, but it is possible that a national sales company may be formed.

New Electrical Showrooms

The electricity showrooms of the Malvern Urban District Council at 1, The Exchange, Church Street, were opened on October 31st. There is a display of electrical appliances by the Revo Electric Co., Ltd., and cookery demonstrations have been given daily during this week.

A Marco Refrigerator

The price of the Marco "Whitehall" refrigerator described on page 555 of our October 14th issue is 29 guineas, not 39 guineas as stated.

The Leipzig Autumn Fair

A total of 5,422 firms took part in the recent Leipzig Autumn Fair, the number of visitors being about 70,000, of whom 300 were from Great Britain and Ireland. Business generally was a reflection of the prevailing economic situation, and exhibitors offered chiefly articles in the cheaper and medium price ranges. There was a demand for practical utility goods, but very little for luxury wares, and business men generally seem to be cautiously awaiting a turn in the tide of the world's trade.

Domestic Apparatus in Scotland

An impetus has been given a new industry in Lanarkshire—the manufacture of domestic electrical appliances—by an agreement which has been completed between the British National Electrics, Ltd., Mossend, and an American corporation. The Mossend company, which was founded last year, is now entrusted with the manufacture for Great Britain, the Continent, and all the British Colonies of all the products which the American corporation exported in past years. Mr. J. Jardine, managing director, states that the company will now make with British labour a complete range of appliances which had never been manufactured in Scotland before. Sir James Lithgow is chairman of British National Electrics. Colonel Colville, secretary to the Department of Overseas Trade, a former chairman and one of the founders, is still interesting himself in the company's development.

The G.E.C. in India

The General Electric Co. (India), Ltd., has just moved its headquarters at Calcutta to Magnet House, Central Avenue.

The Wellington Exhibition

In connection with the West Midlands Joint Electricity Authority's distribution scheme in Shropshire, an electrical exhibition was held in the Baths, Wellington (Salop), from October 24th to October 29th; it was organised by the Authority in conjunction with its installation contractors. From the tone of the inquiries received and the attendance of over 5,500 people, the effort appears to have been amply justified. The exhibition was opened by Dame Ethel Shakespear, president, Electrical Association for Women (Midlands), others present including Alderman J. Bell, J.P., Councillor and Mrs. O. D. Murphy (Mayor and Mayoress of Wenlock), Mr. E. F. Hetherington (chief engineer and manager), and Mrs. Hetherington. A comprehensive transport programme was arranged for those living in outlying villages, where the Authority's supply lines are available or will be shortly, and morning and afternoon visits from colleges and schools in the country were organised. There was a good attendance from the farming community, which was keenly interested in the farming and agricultural equipment display. In addition, there were very varied exhibits of domestic appliances, industrial and street lighting fittings, shop lighting fittings, &c. Cooking demonstrations were given and the result from these will be that the demonstration staff will have plenty of good follow-up work to attend to for a long while. A list of the exhibitors was given in our issue of October 21st, p. 610. Two views of the exhibition are reproduced in the accompanying illustrations.

Yeovil Electricity Offices Floodlighted

The accompanying illustration shows the electricity offices, Reckleford House, Yeovil, floodlighted, and is an excellent example of electricity propaganda. Only one Benjamin

A "one-light" floodlighting installation

"Duoflux" floodlight is used, the even illumination being obtained by erecting the fitting on a stand 22ft. high and over 100 ft. from the building; a 1,000-W lamp is used.

New French Companies

Among the companies recently formed in France are the Société des Industries Radio-Electriques, Paris (4, Square du Roule), capital two million francs; La Société des Anciens Etablissements Milletre et Dive, Paris (283, Rue des Pyrénées), to manufacture insulating mouldings; and La Société de Construction Mécanique et Electrique de Montreuil, Montreuil-sur-Bois (18 Rue de Vitry).

Lamp Production in Sweden

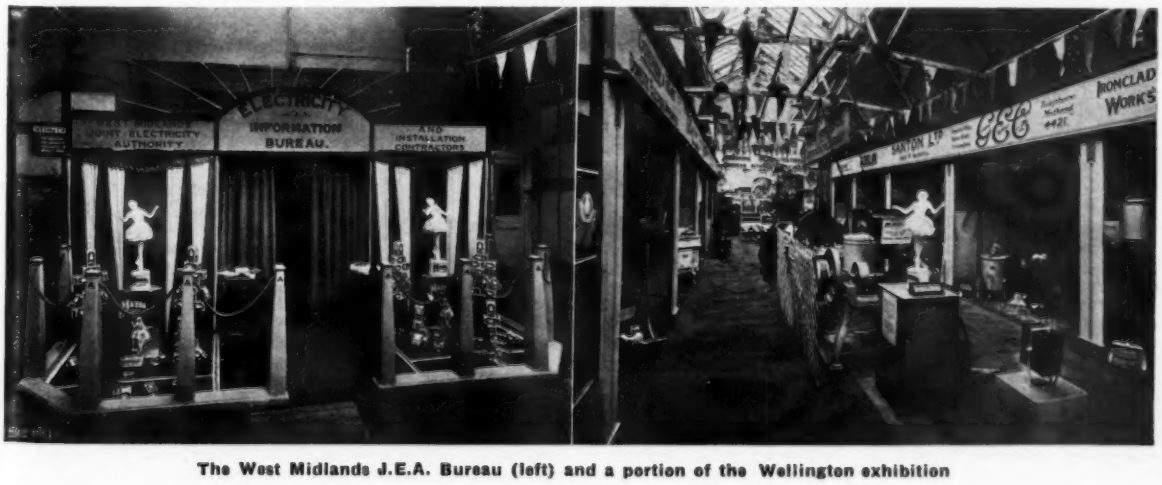
It is reported from Stockholm that the International Glow Lamp Trust has requested the Swedish Co-operative Lamp Producers' Association to cease the production and sale of "Luma" lamps, and has threatened proceedings against the Association for alleged infringement of patents if it fails to do so. The director of the Association, however, states that before starting manufacturing the Association ascertained that it would be able to produce a good lamp independent of any other patents and that activity will continue as hitherto despite the threat. Since the factory was started a year or so ago it has delivered about 6,000,000 lamps to the co-operative societies in Sweden, Norway, Denmark and Finland.

Recent Contracts

The "Keepalite" emergency lighting system of the Chloride Electrical Storage Co., Ltd., has been installed at the London Coastal Coaches' new station, Victoria, S.W., for the restaurant and dance hall. The electrical contractors were Electrical Installations, Ltd.

The Hart Accumulator Co., Ltd., has received an order for renewals to a "Hart" battery of fifty-four cells supplied ten years ago and installed in the South Travancore (S. India) Medical Mission of the London Missionary Society.

The Gamewell street fire alarm system which has just been ordered by Wood Green Urban District Council from Standard



The West Midlands J.E.A. Bureau (left) and a portion of the Wellington exhibition

Telephones and Cables, Ltd., incorporates a new feature that has not been included in any previous installation. This new development is an illuminated indicator incorporated in the switchboard at the fire station, and it was adopted to fulfil the requirements of the fire brigade authorities of the district. This indicator is built up of the requisite number of small ground glass panels, to the back of each of which is affixed the associated street box number and its situation. On the receipt of a fire call the appropriate panel on the indicator is illuminated, and remains so until cancelled by the duty man. This signal is in addition to the usual visual and audible fire call given when a street alarm is pulled. The equipment covered by the contract comprises thirty Gamewell succession-type street boxes arranged in two circuits, each of which terminates on the switchboard, and the necessary recording apparatus at the central fire station in Bounds Green Road. This new installation replaces a system of similar make which has been in continuous service for the past thirty years.

Brookhirst Switchgear, Ltd., has received an order from the Cardiff Corporation Electricity Department for nine of its new e.h.p. oil pressure breakers. The contract covers three 250-A, three 350-A, one 750-A, and two 1,500-A breakers, all for 6,600V. Each unit will embody "Whitehead" internal isolation, allowing the units not merely to be isolated but also to be examined without withdrawing. A number of contracts for l.p. oil-pressure breakers, including a 54-panel board for Messrs. Lewis's new premises in Leeds, and several other smaller boards have also been executed recently by this company.

A Display Cabinet for Accessories

A well-designed counter display cabinet containing thirty of the most popular types of "Rosomil" electrical accessories particularly suitable for use in the home is available free of charge to trade customers from Messrs. Thomas A. Rose & Son, Ltd., 25, Milton Street, E.C.2. The items covered include two-way switches, plugs and sockets, bell pushes and various types of connectors. This company is also supplying very attractive Christmas gift boxes retailing at 7s. 6d., which contain four of these accessories most generally in demand and which should be of use in every modern home.

The "Rosomil" accessory counter display cabinet

Clydebank Baths Electrical Installation

Clydebank's new municipal baths were formally opened by Provost McKenzie on October 25th and during the current week the building has been open for inspection. The whole building is well illuminated, the pond hall being particularly favoured with reflecting lamps, which flood the surface of the water with light completely free from shadows. An artificial sunroom is provided in which three types of artificial sunlight lamps have been installed. The contractor for the electrical work was Mr. Robert Shaw, Clydebank and Glasgow. The filtering apparatus used at the baths was manufactured by the Pulsometer Engineering Co., and the erection was carried out under the supervision of a Clydebank engineer, Mr. John Smith. The swimming pool is seventy-five yards long and thirty yards broad, and there are Turkish, Russian, and medicinal foam baths. The total cost of the scheme was £42,000.

The Brewers' Exhibition

In the Brewers' Exhibition, at the Agricultural Hall, which closes to-day, many of the requirements of catering firms are shown in addition to those of brewing businesses. Messrs. C. Peto Bennett show a bottle washer, belt-driven by a 1-h.p. motor mounted on a bracket on the tank; the temperature of the washing solutions is thermostatically controlled. The Aluminium Plant and Vessel Co. exhibits a rotary bottle pasteuriser driven by a 1-h.p. motor and provided with an electric hoist and an electrically controlled thermostat in the steam valve. Dawson's single-stopper sterilising machine is now fitted for electric drive.

Franco Signs are showing neon "Edglite" signs. The announcement is etched on two or more glass panels, and the neon tubes concealed behind the horizontal metal strips of the H-shaped support. The Brilliant Sign Co. displays a new "Durasign" and "Acetate" and "Neolume" letters for box or skeleton signs. Caspar, Ltd., have some effective imitation neon signs; the advertisement is etched in colour on the glass and ordinary lamps are used for illumination. Negretti and Zambra show a new panel-fronted distance recording thermometer and a new depth or contents gauge.

H. J. West & Co. exhibit a range of electrically driven compressors and beer coolers. L. Lumley shows a new waffle iron with a warning light to indicate when the waffle is cooked and a new enclosed electric grill. Hope's Heating and Lighting, Ltd., have electrically controlled oil burners for central heating; when the temperature falls below a given limit the burner is restarted by an electric spark.

A number of the exhibitors employ electric motors for the driving of their machines.

The British Engineers' Association

The annual meeting is to be held at the Hotel Victoria, W.C.2, on Thursday next, at 12 noon. At the luncheon which follows, Mr. W. Reavell, the President, will speak on "The British Engineers' Association in Retrospect and Prospect." The October-November *Bulletin* contains an article on the Ottawa Trade Agreements as affecting the British engineering industry.

A Draughtsman's Diary

The first diary for 1933 to come to hand is that of the Association of Engineering and Shipbuilding Draughtsmen. This is neatly bound in maroon morocco leather, and in addition to the usual commercial information, contains a great deal of useful technical data.

Social Events

On Thursday and Friday of last week, the "Clesco" Light Operatic and Dramatic Club of the County of London Electric Supply Co., Ltd., gave two performances of "Adam's Apple," by Arthur Ashdown, an original "farcical affair." The story of the search for a lost apple in which is hidden a diamond, and the efforts of the inventive Adam Pentler (Mr. Clifford Thatcher) to dispose of worthless shares provided many humorous situations, in which a large and excellent cast scored a great success. There were two musical numbers by Mr. Ashdown, specially arranged and orchestrated by Walter E. Dossett, the first—"Ever Since"—being particularly tuneful. In addition to Mr. Thatcher, others prominent were Miss Maisie Covell, Lawrence Adams, and Arthur Ashdown.

The annual staff dinner of British Insulated Cables, Ltd., took place on October 28th, at the Adelphi Hotel, Liverpool. The attendance was 680, against the previous record of 585. All present at the big gathering were plainly resolved to enjoy themselves to the full, and as usual the opportunities for enjoyment were many and diverse. After dinner an entertainment was given by the "Duds" Concert Party, whilst for those who preferred to entertain themselves there was a dance. A whist drive was also organised. Among those present were Sir Alexander Roger, chairman of the company, Mr. John Ferguson, vice-chairman, Mr. Eric Taylor and Mr. D. Johnstone Sinclair, directors, and Dr. J. Carlton Stitt.

The G.E.C. Dramatic Society will present "Hawk Island," a play by Howard Irving Young, at the Portland Hall (Polytechnic), Little Titchfield Street, W., on the evenings of November 17th and 18th. Applications for tickets may be made to the secretary of the Society at Magnet House, Kingsway, W.C.2.

Old Cromptonians' Dinner

The annual dinner of the Old Cromptonians' Association was held on Friday last at the Hotel Victoria. Among the company there were several members who were pupils at the old Arc Works before 1885, and over twenty whose association with the company dated back about forty years. Col. Crompton recalled that he turned his attention to electrical engineering when his proposals for commercial mechanical road transport were derided and ridiculed, so that the industry gained him at the expense of another. In replying to the toast of the company, Mr. Frank Parkinson said he felt that the human side of the industry was becoming of more importance every year and that he would like to see more of the younger Cromptonians (among whom he numbered himself) as members of the Association. He referred to his efforts for the formation of a great British company, making a complete range of electrical products, entirely free from foreign influence or the domination of foreign capital. That ambition had been partially realised by the recent association of the company with the British Electric Transformer Co., Ltd., and Derby Cables, Ltd.

Trade Announcements

Messrs. Ward and Goldstone, Ltd., have removed their Glasgow depôt from the basement of Baltic Chambers, 3, Cadogan Street, Glasgow, to more commodious premises on the first floor. Mr. Maurice Goldstone is acting as the resident representative for Scotland.

Messrs. R. Millett & Sons, 53, King Street, Ramsgate, have transferred their electrical department to Laslett & Co., who have opened new premises at 39, Queen Street, in that town.

The Leeds branch of Messrs. W. T. Henley's Telegraph Works Co., Ltd., has been transferred to 1, York Place. The telephone number remains unchanged.

Messrs. Fenemore, Howlett & Co., Ltd., electrical contractors, have disposed of their branch business at High Street, Cranleigh, Surrey, to Miss E. A. Farrow, who is carrying on the business under the name of E. A. Farrow & Co.

Prices of Materials

Messrs. F. Smith & Co. report, November 2nd: Electrolytic copper bars, sheets and wire rods, no change. Electrolytic copper h.c. wire, 6½d., 1/16d. dec.; Silicium bronze wire, 7 11/16d., 1/16d. dec.

Messrs. Edward Till & Co. report, November 2nd: India-rubber, Para fine, no change.

Messrs. James & Shakespeare report, November 2nd: Copper bars (best selected), sheet and rod, no change. English pig lead, £13 10s., 5s. dec.

New Catalogues and Lists

Electro Dynamic Construction Co., Ltd., Devonshire Grove, S.E.15.—List No. 132/1, dealing with d.c. to a.c. rotary convertors for operating neon signs, X-rays, talking picture equipment, &c.

Fraser & Howard, Ltd., 22, Ely Place, E.C.1.—A circular illustrating an attractive table lamp.

Hugh J. Scott & Co. (Belfast), Ltd., Volt Works, Ravenhill Avenue, Belfast.—A detailed price list of "Scott" motors.

British Aluminium Co., Ltd., Adelaide House, E.C.4.—An illustrated booklet on aluminium busbars and connections.

Brush Electrical Engineering Co., Ltd., Falcon Works, Loughborough.—A catalogue describing the company's greatly extended range of "N" type induction motors.

Power Plant Co., Ltd., West Drayton, Middlesex.—A calendar for November containing a supply of squared paper.

Electradix Radios, 218, Upper Thames Street, E.C.4.—Copies of the "Electradix" illustrated sale lists.

George Ellison, Ltd., Perry Barr, Birmingham.—A brochure illustrating some of the company's apparatus used at the new Ironbridge power station.

Edison Swan Electric Co., Ltd., 123-5, Queen Victoria Street, E.C.4.—A 32-page booklet giving details of "Ediswan" wiring systems.

Meldrums, Ltd., Timperley, Manchester.—A leaflet describing a type of furnace which has recently been very successfully employed in destroying noxious fumes in chemical works.

Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester.—Leaflets Nos. 350/1-2 and 350/7-2, containing particulars of the revised list prices and discounts relating to miniature "Pivaspring" instruments.

Ferguson, Pailin, Ltd., Higher Openshaw, Manchester.—Catalogues Nos. 2A3, 32A4, 82A1, 91A1, and 183A11 dealing respectively with the company's mechanical testing laboratory, round tank oil circuit breakers, automatic reclosing mechanism, control wiring, and a duplicate busbar metal-clad unit incorporating a round tank oil circuit breaker.

Arora Co., Loughborough.—A leaflet designed to assist the contractor in working out the load of an "Arora" tubular heating installation.

Falk, Stadelmann & Co., Ltd., 83-93, Farringdon Road, E.C.1.—An illustrated brochure on modern lighting for shop-windows, ballrooms, churches, theatres, &c. Also a lamp price list and an announcement of a reduction in prices of British-made glassware and "Sunstar" reflectors.

Marconiphone Co., Ltd., 210-212, Tottenham Court Road, W.1.—Several leaflets referring to "Marconiphone" radio-gramophones and radio receivers.

Ferranti, Ltd., Hollinwood, Lancs.—List No. Wa. 522 (price 3d., post free) relating to the construction of power units for radio receivers and amplifiers.

Elliott Brothers (London), Ltd., Century Works, Lewisham, S.E.13.—A 44-page catalogue (No. 320) illustrating and describing "Siemens" thermo-electric pyrometers.

General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.—Section M of the company's measuring instruments catalogue.

Philips Industrial, 145, Charing Cross Road, W.C.2.—An illustrated brochure giving a list of applications, together with technical details, of Philips amplifying apparatus.

Igranic Electric Co., Ltd., 149, Queen Victoria Street, E.C.4.—Leaflet No. 450/36, referring to an enclosed type float switch.

W. T. Henley's Telegraph Works Co., Ltd., Holborn Viaduct, E.C.1.—A booklet, copiously illustrated, dealing with the Henley wiring systems—the twin metal sheathed, "Bondit" and "Nomet."

Thomas A. Rose & Son, Ltd., 25, Milton Street, E.C.2.—An illustrated list of British-made "Bakelite" electrical and radio accessories.

Watson & Sons (Electro-Medical), Ltd., 43-47, Parker Street, Kingsway, W.C.2.—A booklet and folder dealing with the new "Sunic" Mark III shockproof dental X-ray unit.

Tangyes, Ltd., Cornwall Works, Birmingham.—List No. 448, containing particulars of the company's latest garage equipment.

Ateliers de Constructions Electriques de Charleroi, 56, Victoria Street, S.W.1.—A publication (in French) entitled "The Electrical Equipment of Grab Type Cranes and Transporters."

L. Andrew & Co., 2, Whitworth Street West, Deansgate, Manchester. An illustrated price list of "Wrendal" lamps.

Bankruptcy Proceedings

C. E. Pittman, electrical contractor and wireless dealer, 12, Station Road, West Croydon, Surrey.—The public examination was held recently at the County Court, Scarbrook Road, Croydon. The debtor had lodged a statement of affairs which disclosed gross liabilities of £918, of which £831 was expected to rank for dividend, and there was a deficiency of £673. The failure was attributed to profits from the business being insufficient to meet heavy overhead charges and bad debts. The electrical side of the business had been successful, but the wireless venture was a failure. The examination was adjourned for closing.

M. Tinner (the Yorkshire Trading Co.), electrical factor, 91, Porter Street, Hull.—The public examination was held on October 24th, at the Guildhall, Alfred Gelder Street, Hull, when the statement of affairs showed a deficiency of £194. The examination was closed.

C. G. Smith, electrical contractor, 66, Lichfield Street, Wolverhampton.—Second and final dividend of 7¾d. in the £, payable October 27th, at the office of the trustee, 14, Lichfield Street, Wolverhampton.

F. Finch, radio engineer, 2a, Fishergate Hill, Preston.—Public examination November 18th at the Sessions Hall, Lancaster Road, Preston.

N. G. Crews, electrical engineer, 99, Clapham Road, Lowestoft.—Last day for receiving proofs for dividend November 5th. Trustee, Mr. C. B. L. Prior, 4, Eastbourne Place, Prince of Wales Road, Norwich, Official Receiver.

G. E. Hughes, electrical engineer, 90, Gibbett Street, Halifax.—Last day for receiving proofs for dividend November 5th. Trustee, Mr. J. O. Morris, 71, Manningham Lane, Bradford, Official Receiver.

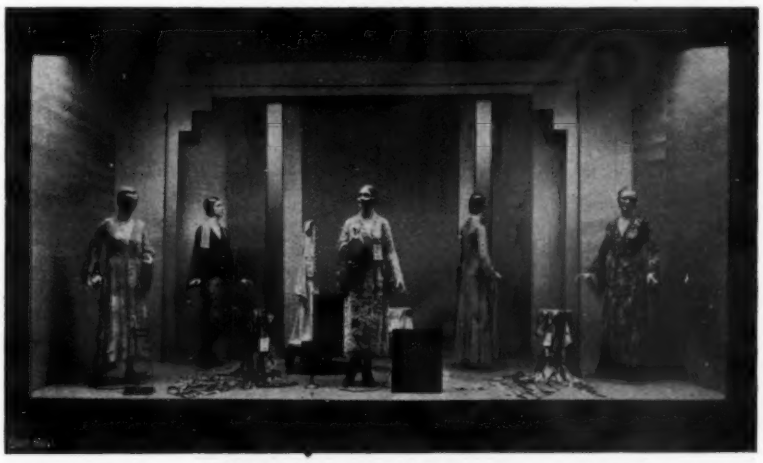
C. T. Watson, wireless dealer, 50, High Street, Heanor.—Receiving order made October 24th on debtor's own petition.

J. S. Blackburn, electrician, Borough Street, Castle Donington.—Trustee, Mr. L. A. West, 22, Regent Street, Park Row, Nottingham, Official Receiver, released October 10th.

R. Ramsden, wireless and electrical contractor, 29, Gibbet Street, Halifax.—Trustee, Mr. J. O. Morris, 12, Duke Street, Bradford, Official Receiver, released October 3rd.

A. R. King (Kingston Radio Co.), wireless dealer, 18, Vernon Street, Newark.—Trustee, Mr. L. A. West, 22, Regent Street, Park Row, Nottingham, Official Receiver, released October 10th.

H. Roberts, electrical engineer and contractor, 41, Bloxsidge Street, Langley, Oldbury.—Trustee, Mr. C. Hoult, 191, Corporation Street, Birmingham, Official Receiver, released October 3rd.



Excellent effects are obtained at Messrs. Selfridge's stores in Oxford Street, London, where the "Gecoray" shop-window lighting system has been installed throughout the entire frontage

T. G. H. Wiley (Wiley & Co.), electrical engineer, Bradford Road, Stanningley.—Supplemental dividend of 6d. in the £, payable November 4th at the Official Receiver's office, 71, Manningham Lane, Bradford.

N. Sutton (Sutton's Wireless Service), wireless dealer, 169, High Street East, Wallsend.—First and final dividend of 2s. 1½d. in the £, payable November 7th at the Official Receiver's office, 31, St. Mary's Place, Newcastle-upon-Tyne.

P. R. Andrews, electrical engineer, Middleton Street, Wymondham.—First and final dividend of 8s. 11d. in the £, payable November 1st at the Official Receiver's Office, 4, Eastbourne Place, Prince of Wales Road, Norwich.

Wholesale Radio Components Co., radio dealers, 9, Victory Parade, Sutton Road, Prittlewell.—Receiving order made October 19th on a creditor's petition. First meeting to-day (Friday) at 29, Russell Square, W.C. Public examination November 24th at the Petty Sessions House, Southend.

Company Liquidations

Central Electric Supply Co., Ltd.—Winding up voluntarily. Joint liquidators, Messrs. C. Parker and E. H. Barrenger.

Central Electrical Co. (Nottingham), Ltd.—Meetings December 3rd at Queen Street Chambers, Peterborough, to receive an account of the winding-up by the liquidator, Mr. J. Stephenson.

Western Counties Electrical & Engineering Co., Ltd.—Particulars of claims by November 18th to the liquidator, Mr. A. Collins, 28, Baldwin Street, Bristol.

Medway's Safety Lift Co., Ltd.—Particulars of claims by November 30th to the liqidator, Mr. F. Poole, 10, St. Swithin's Lane, E.C.

Overseas Radio Co., Ltd.—Meeting November 28th at 5 and 6, Clement's Inn, W.C., to receive a report of the winding-up by the liquidator, Mr. W. J. Matthews.

Changes of Name

Messrs. Fullers (Ilford), Ltd., mechanical and electrical engineers, accumulator manufacturers, &c., 13, High Road, Ilford, have changed their name to Block Batteries, Ltd. Block Batteries, Ltd., of the same address, is now known as Fulsud, Ltd.

Northants Electrical Installations, Ltd., 40, Cowgate, Peterborough, has changed its name to Leslie Neaverson, Ltd.

Electricity Supply

Lighting, Domestic, Power

Birkenhead.—NEW SUB-STATION AND MAINS EXTENSIONS.—Subject to the necessary loan sanctions being obtained, the Electricity Committee has decided to provide a new sub-station at Cleveland Street at a cost of £3,000 and to lay a main from New Ferry to Eastham at a cost of over £1,000.

Bridge (Kent).—REQUEST FOR SUPPLIES.—The Rural District Council has passed a resolution urging the Electricity Commissioners to utilise their powers to obtain a supply of electricity for parishes within the Council's area.

Bridlington.—OFFER TO PURCHASE UNDERTAKING.—The Town Council has deferred consideration of a communication from the Bucklows Light & Power Co., Ltd., inquiring whether the Corporation was prepared to dispose of the electricity undertaking as a going concern to the company.

Brighton.—MAINS EXTENSIONS.—The extension of mains at a cost of £1,143 in various districts is recommended by the borough electrical engineer.

SUPPLY TO CUCKFIELD PREMISES.—The Electricity Commissioners have approved an application from the Corporation to supply electricity to certain premises in Cuckfield.

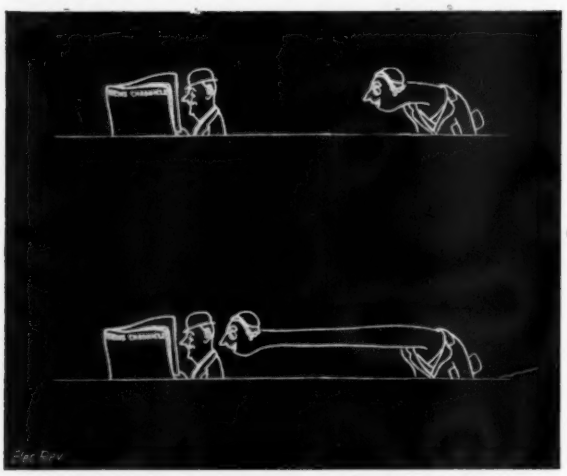
CHRISTMAS ILLUMINATIONS.—At the request of the West Brighton Traders' Association, the Electricity Committee has agreed to assist in this year's Christmas illuminations by allowing the use of its illuminating strip at the charge of 5s. per 100 yards for the period, the cost of the electricity used to be 2d. per kWh. A further half mile of this strip is to be purchased at a cost not exceeding £300.

Canada.—TORONTO.—We have received from the Toronto Electricity Commissioners a copy of their annual report on the hydro-electric system covering the year ended December 31st, 1931. The gross income amounted to $12,354,456, as compared with $12,734,520 in the preceding year, while the cost of purchasing electricity and expenses of operation and management declined from $8,940,505 to $8,676,010. The net income carried to reserve for stabilisation of rates was $233,720 ($494,745 in 1930). The electricity sold increased from 802,527,302 to 836,440,198 kWh, and the peak load from 303,887 to 306,084 h.p. A reduction in power rates was responsible for a decrease of over $107,000 in revenue.

Cheltenham.—EXTENSIONS.—The Electricity Committee has approved a scheme for the extension of the supply to Crickley Hill, Witcomb Park, and Birdlip village at an estimated total cost of £2,952.

Chester.—BULK SUPPLY.—The Town Council is to enter into an agreement with the Central Electricity Board for a bulk supply.

Chester-le-Street.—OVERHEAD LINES INQUIRY.—The Ministry of Transport has held an inquiry into an appeal by the North-



An animated sign 108 ft. long and 15 ft. high has been erected by Boro' Electric Signs upon a site overlooking the Thames in London. We illustrate the first two stages; the third spreads across the sign "Don't Overlook the *News-Chronicle*"—the paper's name being in 8-ft. letters. The sign embodies 1,400 ft. of neon tubing and is operated at 10,000 V by means of fifty transformers

Eastern Electric Supply Co., Ltd., against the opposition of the Urban District Council to the erection of overhead cables by the company. The Ministry held a similar inquiry five years ago and decided in favour of the company, the position to be reviewed at the expiry of five years. The hearing was for the purpose of a review. Mr. J. Mawson, of Durham, said that complaints had been received from local residents that the poles were unsightly and depreciated the value of their property. Thousands of pounds had been spent in beautifying the countryside, and now poles were going to destroy all that had been done. Mr. E. N. Robinson, for the Supply Co., said that had the cables been placed underground the cost would have been 92 per cent. greater. If the company was to supply electricity at an economical figure overhead lines were essential. The inspector intimated that he would give his decision later.

Dewsbury.—MAINS AND SERVICES.—The Electricity Committee is to apply for sanction to a loan of £20,000 for mains and services.

Dover.—BULK SUPPLY AGREEMENT SEALED.—An agreement for a bulk supply of electricity from the Central Electricity Board was sealed at a meeting of the Town Council last week. Immediately afterwards Councillor H. A. J. Ryeland gave notice of motion to rescind the agreement as he did not feel that the Council was being sufficiently protected.

Dumfries.—PROGRESS OF ELECTRICITY SCHEMES.—Considerable progress is reported by Mr. J. S. Pickles, county electrical engineer, in connection with the scheme for the electrification of the county on which work was commenced in December last. Upwards of 150 miles of 11,000- and 33,000-V overhead lines have now been erected, and one main sub-station at Gretna is completed at which a 33,000-V supply is already being received from the Central Electricity Board. Eleven other sub-stations have also been installed and are ready for service. A second bulk supply will be taken from the Central Electricity Board at Dumfries and is expected to be available early next year. Underground cable distribution networks have been laid in eight of the principal burghs and villages, and contracts have been let for l.p. overhead distribution systems in about fifty of the smaller villages. Schemes which have been issued covering assisted wiring, hire and hire-purchase of apparatus are meeting with a very favourable reception.

Durham.—SCHOOL LIGHTING INSTALLATIONS.—The Education Committee has been informed by the Board of Education that it is unable to sanction the expenditure in connection with the installation of electric lighting in the Washington Biddick, Wolsingham, Waldridge Lane and Blackhill Council Schools. The Board has, however, approved the installation of electric lighting at the Castleside Council School. The Committee has asked for comparative estimates to be prepared of the cost of installing gas or electricity at the Blaydon Secondary School, but has deferred a scheme for the North Hetton Council School. Tenders are to be invited for installations at the East Stanley, Tanfield, Burnopfield Leazes, Hawthorn and Middleton-in-Teesdale Council Schools, subject to the Board's sanctioning the expenditure.

Eastbourne.—RURAL ELECTRIFICATION.—The Electricity Committee is to apply for sanction to a loan of £21,258 for the carrying out of a further section of the rural electrification scheme.

Eastry.—ELECTRICITY FOR NORTHBOURNE VILLAGE.—The South East Kent Electric Power Co., Ltd., has informed the Rural District Council of its intention to give a supply of electricity to Northbourne village.

Faversham.—SUB-STATION FOR BULK SUPPLY.—The Town Council has applied for sanction to a loan of £5,067, the cost of establishing a sub-station, etc., in connection with the bulk supply of electricity.

Finchley.—MAINS EXTENSIONS.—The Electricity Committee is to extend mains at a cost of £1,105.

Glasgow.—MAINS EXTENSIONS.—The Electricity Committee is to lay distributing mains at a cost of £8,415.

PROGRESS DURING SEPTEMBER.—Under the Electricity Department's scheme 122 houses were wired in September, making the total to date 36,519, while hired appliances installed numbered 12, bringing the total to 19,176.

Guildford.—EXTENSIONS.—The Electricity Committee is to provide supplies to Peasmarsh at a cost of £2,265, and to Chilworth (£360). An application for a supply has also been received from Compton and the matter is under consideration.

Iraq.—NEW POWER STATION FOR BAGHDAD.—Work is rapidly approaching completion on the erection of a new power station in Baghdad by the Baghdad Light & Power Co., Ltd. For some time past a temporary installation has been supplying power to 5,855 consumers in the city, which has a population of about 300,000.

Irish Free State.—E.S.B. CUTS OFF BALLYHAUNIS SUPPLIES.—Because the Board of Health for the County Mayo had not taken definite responsibility for the control of the public electric lighting at Ballyhaunis, the Electricity Supply Board has cut off the supply. Since electricity was supplied to Ballyhaunis on August 5th, the E.S.B. has made repeated application to the Board of Health to assume responsibility for the future of the scheme. The Board of Health pointed out that the public lighting supply was given without its authority, and nothing could be done until the local committee in Ballyhaunis took action.

Isle of Man.—DISTRIBUTION SCHEME APPROVED.—The Tynwald Court has given its final approval to a scheme for the distribution of electricity throughout the island. A Board which will administer the scheme has been elected, and work is to be put in hand immediately. The scheme is similar in constitution, though, of course, on a scale suitable to the island's requirements, to that in operation in Northern Ireland. The Board will purchase electricity in bulk from the Douglas Corporation, and will distribute the energy throughout the remainder of the island, the principal centres which will take the supply being Ramsey, Castletown, Peel, Port Erin, and Port St. Mary, with the intervening villages. Distribution will

be by means of overhead lines, and the Board reserves the right to end its arrangement with Douglas Corporation and generate its own supply. Most of the work, it is anticipated, will be carried out this winter, and it is hoped to have the principal centres ready to take supplies by next Whitsun. The estimated cost of the scheme is about £100,000, and it will be financed by means of a loan floated by the Board, and secured upon the undertaking and a deficiency rate which will be levied upon property within the area of supply should a deficiency occur. The general lowering of interest rates will enable the Board to raise a loan at a cheaper rate than would have been the case twelve months ago, and will enable it to charge less for supplies. As far as possible, it is intended to use British materials in the undertaking.

Japan.—ELECTRICAL DEVELOPMENTS.—By the construction of a reservoir costing 10,000,000 yen the Daido Power Co. will be able to increase the output of its Kisogawa power station by 50,000 kW.

Official permission has been granted to the Fuji Power Co. for the erection of a 5,000,000 yen power station at Kawayuyama.

THE I.G.R.'s PLANS.—Included in the I.G.R.'s proposed schemes for the year 1932-33 is the allocation of 10,000,000 yen to electrical works, the largest item being the building of the Shinano River power station, the cost of which is estimated at 4,000,000 yen. About 1,000,000 yen is to be spent on a transmission line to the Shimizu Pass, while another important scheme provides for a 70-km. transmission line between Atami and Numadzu.

Leicester.—LARGE LOAN FOR EXTENSIONS.—The Electricity Committee is applying for sanction to a loan of £150,000 for the extension of mains and services.

Liverpool.—RAILWAY SUPPLIES.—Arrangements have been completed for the Electric Power and Lighting Committee to deliver a large supply of electrical energy to the Cheshire Lines Railway Committee.

NEW SUB-STATION.—A new sub-station costing £1,969 is to be provided at Monument Place, and the Electric Power and Lighting Committee has decided to extend h.p. and l.p. mains to this point as soon as possible.

LOANS SANCTIONED.—Sanction has been received to loans of £12,238 to cover excess expenditure in respect of extensions to the boiler-house plant at Lister Drive power station, and £300,000 for general mains extensions.

London.—SOUTHWARK.—The Electricity Committee is applying for sanction to loans of £1,150 for an additional feeder to Camberwell East section pillar, £2,000 for additional distributing mains, £1,600 for new services, £1,800 for new meters, and £2,000 for apparatus on hire or hire-purchase.

ELECTRICAL INSTALLATIONS ON L.C.C. ESTATES.—The London County Council Housing Committee has entered into an agreement with the St. Marylebone Borough Council for the supply of electricity for lighting to tenements on the Lilestone Estate, subject to the Council's bearing the cost (approximately £10 13s. per tenement) of the wiring and rising mains. The Housing Committee has also accepted an offer of the County of London Electric Supply Co., Ltd., to install electricity at the Roehampton Estate, Wandsworth, and the Bourne Estate, Holborn, subject to suitable conditions and to the Council's being put to no expense.

Maidstone.—MAINS EXTENSIONS.—The Town Council has applied for sanction to a loan of £10,000 for mains.

Manchester.—ADDITIONAL STAFF REQUIRED.—The number of applications for electricity supplies continues to increase, and during the first five months of this year exceeded that of the corresponding period of two years ago by 80 per cent., the actual number being 15,250, as compared with 8,449. To deal with the applications efficiently the Electricity Committee has decided that the time has come to increase the staff, and certain new appointments are to be made.

Mountain Ash.—SATURATION POINT ALMOST REACHED.—It is with pleasure that we report that the Urban District Council electricity undertaking has reached that happy state when practically all (97 per cent.) of the inhabitants are consumers. Among the advantages accruing to consumers are the facts that the lighting flat rate has been reduced to the low figure of 3d. per kWh (subject to ½d. discount), and that the loan capital has been redeemed without touching the reserve fund, which stands at £11,000. Mr. E. W. Jones, the general manager, and his staff are to be congratulated upon this remarkable achievement.

New Forest.—"PYLONS" AND THE LAW.—The suggestion that a special Act of Parliament would be necessary before "pylons" could be erected in the New Forest was made by Sir Leslie Scott, K.C., president of the New Forest Association, at the annual meeting of the Association last Saturday. After referring to the New Forest Act, 1877, to the creation of the Forestry Commission in 1919, and to the Order in Council of 1923 handing over the forest to the care of the Forestry Commission, he pointed out that no mention was made of Crown lands in the powers conferred on the Central Electricity Board. The Board could, he added, if it erected pylons, be prosecuted in the Verderers' Court for trespass.

New Zealand.—DUNEDIN.—The Town Council proposes to spend £50,000 on mains, meters and sub-stations.

Plymouth.—CHANGE-OVER PROGRESS.—A further stage in the work of changing-over the electricity supply of Devonport and Stonehouse from d.c. to a.c. was sanctioned by the Electricity Committee last week, when it was decided to lay the necessary cables in nine streets and roads at an approximate cost of £3,000. The Committee was informed that the conversion of the remainder of the area would cost £71,000, and the engineer was instructed to submit a further report suggesting when the work of conversion should be completed. Other cable extensions in thirteen streets in the city were authorised, and a scheme was approved for converting about 750 street lamps to electricity.

Rawtenstall.—LOWER ASSISTED WIRING CHARGES.—As a result of an interview with local contractors, the borough electrical engineer has been able to arrange for a reduction in the prices to be paid by consumers for electrical installations under the assisted wiring scheme.

Shipley.—PROPOSED EXTENSIONS AT CRAG END.—The Electricity Committee has instructed the engineer to prepare a scheme and estimate of the cost of supplying electricity to the Council houses at Crag End.

Stalmine (Fylde).—REQUEST FOR A SUPPLY.—Preesall Council, whose electricity supply is obtained from the salt-mining plant of Imperial Chemical Industries, Ltd., has been asked to extend the service to Stalmine. The Preesall Council has deferred consideration of the matter.

Turning night into day with electric light. The White Star liner *Homeric* in the Southampton floating dock—the largest in the world—undergoing her winter overhaul

Stockport.—DOMESTIC CHARGES REDUCED.—The Town Council has reduced the charge for combined lighting and power for private houses as follows:—A fixed charge on rateable value up to and including £30 of 5 per cent. per quarter; on rateable value over £30 and up to £50, 5 per cent. on the first £30 and 3¾ per cent. on the next £20; and over £50, 5 per cent. on the first £30, 3¾ per cent. on the next £20, and 2½ per cent. beyond, plus a "unit" charge of ¼d.

Stoke-on-Trent.—TARIFF ALTERATIONS.—The Electricity Committee is to supply electricity for the outside lighting of cinemas after 7 p.m. at the late shop-window lighting rate (1.4d. per kWh). Electricity for thermostatically controlled tubular heating installations is to be charged for at ½d. per kWh.

LOANS.—Application is being made for sanction to the following loans: £6,000 for supplying electricity to the Dimsdale area, Wolstanton; £4,000 for supplying Milton; £1,000 for the change-over in the Northwood area; and £1,000 for mains extensions in Regents Road, Fenton.

Stretford.—INCREASE IN CHARGES.—Owing to advanced cost of coal and other charges, the Stretford and District Electricity Board has increased the charge for electricity for lighting purposes by ¼d. per kW; the fixed charge of £7 per annum plus 1¼d. per kWh consumed, by 7½ per cent.; and the annual fixed all-in charge of 15 per cent. on the net rateable value of premises plus ¼d. per kWh, to 15 per cent. and ¼d. per kWh.

Sunderland.—ELECTRICAL HAULAGE PLANT.—The River Wear Commissioners are to substitute electrical gear for the existing steam haulage plant at the North Shipping Dock at a cost of £3,000. Mr. W. Tripp, St. Thomas Street, Sunderland, is the engineer.

Uppingham.—SUPPLY ARRANGEMENTS.—The Rural District Council has been informed that the local electricity company is taking steps to give supplies to Preston, Wing, and Uppingham, from Oakham.

West Bromwich.—POWER CHARGES.—The Electricity Committee recommends the adoption of a flat rate of 1d. per kWh for power consumption of 38,000 kWh and over per quarter.

West Linton.—CABLE EXTENSIONS.—The Lothians Electric Power Co. is preparing to lay a power cable 8½ miles in length from West Linton to Eddleston. It is also intended to introduce electricity to a group of small holdings in Ingliston, near Ratho.

Wolverhampton.—ELECTRICITY FOR BILBROOK DISTRICT.—The Corporation is to provide electricity for the Bilbrook district at a cost of £765.

Traction

Australia.—PROPOSED SCRAPPING OF NON-PAYING SYDNEY TRAMS.—The New South Wales Government has under consideration a plan to scrap all non-paying tramlines in Sydney and to give a franchise to private enterprise to meet the transport needs of the residents in those areas. The Government is said to be losing £90,000 a year on the North Sydney tramway system alone.

It is understood, however, that Mr. Maddocks, Commissioner for Transport in New South Wales, is preparing a scheme under which a large number of new tramcars of the corridor type would be constructed for the Sydney tramways. A total expenditure of £750,000 is mentioned, for which 200 cars would be built at a cost of between £3,000 and £4,000 each.

FUTURE OF TRAMWAYS.—Mr. G. R. Steer, general manager of the Brisbane tramways, speaking as chairman of the Australian and New Zealand Tramways Conference at Adelaide, said that until suitable fuel could be obtained in Australia serious consideration could not be given to any wholesale supersession of electrical operation, notwithstanding any development which might take place overseas. Many millions of pounds had already been invested in Australian tramway systems and must be repaid whether the systems were used or not. His advice, therefore, was to concentrate on making existing methods of transport more attractive, remembering at the same time that obsolescence was a possibility which should be provided for by judicious writing down of capital. The importance of the industry was shown by the fact that in Australia and New Zealand there were 747 miles of electric tramways in which over £32,000,000 had been invested. They employed 21,200 men, and earned last year £9,375,000 in carrying 800,600,000 passengers.

Blackpool.—TRANSPORT DURING ILLUMINATIONS.—Despite bad weather, the traffic returns for the thirty-one days of the illuminations presented to the Town Council last week were stated to be very gratifying. The passengers carried totalled 6,186,415, and the receipts were £47,591.

Brighton.—COUNCIL APPROVES TRAFFIC MERGER.—The Town Council has approved a scheme for the amalgamation of the Corporation tramways and Messrs. Tilling's omnibus service.

Continental.—ITALY.—The Italian Government is planning to expedite the work of electrifying several sections of the railways connecting the Italian with the Austrian and Yugoslavian systems, and giving connections to points throughout central and northern Europe.

The first section of Rome's new underground railway was opened on October 27th by Signor Mussolini.

SWITZERLAND.—Work is approaching completion on the electrification of a further section of the Swiss Federal Railways—the 22-mile line between Wallisellen, Uster and Rapperswil. The line will be operated by single-phase power at 15,000 V supplied from a sub-station at Seebach.

BELGIUM.—Reviewing the general causes of the difficulties encountered by railways all over the world, the Belgian Minister of Transport, in a recent broadcast address, said that the early electrification of Belgian railways would greatly help the national economy by giving employment to a large number of workmen and utilising raw materials. With regard to the financing of the electrification he favoured the inclusion of the scheme in a large-scale plan of reconstruction to be carried out "with prudent promptitude." The Government could defray part of the cost by using money set aside for unemployment relief which would be made available as a result of work given to industrial enterprises.—*Reuter's Trade Service* (Brussels).

Steady progress continues to be made with the electrification of the local railways of the Société Nationale des Chemins de Fer Vicinaux. Among the new sections over which the running of electric trains has lately been inaugurated are those between Courcelles and Trazegnies, Tournai and Hertain, Tournai and Kain, and between Lasne and Rixensart. Nearly 700 miles of the company's system have now been electrified.

HUNGARY.—Good progress is being made with the electrification of the railway, totalling 300 miles of track, between Budapest and Vienna, and trial services are now being run on the first section of the line, about sixty-five miles in length. Thirty-six of the locomotives required are being manufactured by Messrs. Ganz & Co., in collaboration with the Metropolitan-Vickers Electrical Co., Ltd., which is also supplying the sub-station equipment.

Glasgow.—TRAMWAY ABANDONMENT.—The Transport Committee has decided to substitute buses for trams on the Abbotsinch route.

Southern Railway.—TRIALS ON ELECTRIFIED BRIGHTON LINE.—Running trials on the newly electrified line between London and Brighton commenced on Tuesday. Complete satisfaction is expressed with the results and the new services will come into full operation on January 1st.

BREAKDOWN.—A failure at the Deptford power station was responsible for a complete stoppage on the whole of the Eastern Section of the Southern Railway on Tuesday evening shortly before 7 o'clock. Normal running was restored in just over half an hour.

Wolverhampton.—TROLLEY-BUSES.—The Transport Committee is to provide a trolley-bus connecting route in Lower Stafford Street, at a cost of £500.

Communications

Australia.—TELEPHONES.—There are now 485,000 telephones in use in Australia. Of the 6,061 exchanges, that at Sydney City North is the largest, with 7,757 subscribers, the Melbourne Central exchange being second with 7,699 subscribers.

Cardiff.—RADIO TELEPHONE "LINK."—Encouraging results have attended the establishment of an experimental radio link across the Bristol Channel to connect the land telephone circuits at Lavernoch, near Cardiff, on the one side and Hutton, near Weston-super-Mare, on the other. The route consists of twelve miles of radio and seven miles of land circuits. Thus the use of costly submarine cable, or circuitous land lines of forty-five miles, *via* the Severn Tunnel and sixty-nine miles by way of the Severn Bridge, has been avoided. The radio apparatus is arranged to work unattended; very short waves are used, and the aerial systems consist of horizontal dipoles.

Daventry.—THE EMPIRE BROADCASTER.—In reply to a recent question in the House of Commons the Postmaster-General announced that the new B.B.C. Empire radio broadcasting station would commence operation on December 19th next.

Egypt.—WIRELESS COMMUNICATIONS.—Arrangements have been made in Egypt to amalgamate the operation of the Wireless and Cable services, and the Marconi Company of Egypt is in future to be responsible for the working of the Eastern Telegraph Company's cables as well as of its own wireless communications.—*Reuter.*

France.—SUBMARINE CABLE FAULT.—A "break" in the submarine telephone cable near Audresselles, north of Boulogne, put sixteen circuits out of action last week.

Great Britain.—RADIO LICENCES.—The General Post Office, St. Martin's-le-Grand, London, issued the five millionth broadcast radio receiving licence on October 29th.

BROADCAST RADIO RELAY EXCHANGES.—Worthing Corporation reports that 885 subscribers have been connected to the broadcast relay exchange, and that the amount received in supervision fees, payable in advance, since the exchange commenced, amounts to £355.

Rawtenstall Corporation has refused to grant the National Broadcast Relay Co. wayleaves and has decided that the existing permission granted to Messrs. Ball Brothers be reviewed six months prior to its expiration.

Portland Urban Council is to consider applications from Wireless Services, Ltd., the National Broadcast Relay Co., and the Broadcast Listeners' Service, Ltd.

Wealdstone U.D.C. Highways Committee reports that four firms have applied for permission to start a service. Wembley Relay Services, Ltd., proposes to charge subscribers 1s. 6d. per week and also to lend loud speakers if required for 6d. per week, the service being available for 15 hours a day. The Council's revenue would be approximately 4s. per annum from each subscriber, plus any wayleave rental for wires crossing highways at 1s. each. The Committee decided that if the company would submit a draft agreement the Council will give it careful consideration.

Pontefract Corporation has refused to grant permission to three companies for operating broadcast relay services in the borough.

The Town Clerk of Accrington has reported that two firms have already installed systems in certain localities, but have not signed the necessary agreement, nor have they made any payment respecting wayleaves. It was resolved that the provisional consent given in one case be withdrawn, and that the borough engineer should give notice to both persons to take down the overhead wires erected by them. Numerous applications from companies desirous of establishing relay services have been received. The Council has decided that the borough shall be divided into eight or more areas, applicants to be at liberty to tender for one or more of such areas.

Italy.—NEW BROADCASTING STATION.—The recent opening of the high-power broadcasting station at Bari closely followed that of the new stations at Trieste and Florence. All three transmitters were manufactured at the Marconi works at Chelmsford. The unmodulated aerial energy of the Bari transmitter is 20 kW with a maximum modulation of 100 per cent. The transmitter is adjustable over a waverange of 250 to 550 metres, the working wavelength being 273.73 metres. The aerial, which is of the quarter-wave "T" type, is suspended from two 80-metre earthed self-supporting steel towers placed 180 metres apart, the downlead of the aerial terminating in a feeder house situated below the aerial.

The power of the Milan station has been increased from 7 to 50 kW.

Peru.—TELEPHONE SERVICE WITH NORTH AMERICA.—Another South American country is now within reach of North America by telephone, following the inauguration of a service which links telephones in the United States, Canada, Cuba, and Mexico with those of Lima, Callao, and other Peruvian towns. The connection between North America and Peru is formed by a radio circuit between the American Telephone and Telegraph Co.'s radio stations in New Jersey and those of All-America Cables, Inc., at Lima. It employs a wavelength of about 15 metres (about 19,000 kilocycles).—*Reuter's Trade Service* (New York).

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Aberdeen.—November 7th. Corporation. Electric lighting at new shelter, &c. Mr. T. F. Henderson, city engineer.

Australia.—MELBOURNE.—December 13th. Post and Telegraph Department. Lead-covered switchboard cable. (A.X. 11545.)*
December 19th. City Council. Totally enclosed metal-clad 6,600-V switchgear. (A.X. 11544.)*
GRAFTON.—December 19th. Clarence River County Council. 1,000-kVA turbo-alternator set for Nymboida power station. (A.X. 11561.)*

Beeston.—November 10th. Urban District Council. Wiring for 290 houses on the Council's housing estate. Mr. E. A. Bush, surveyor, Public Offices, Beeston.

Bolton.—November 7th. Corporation. Electrical installation at 416 houses and flats, &c., on the Johnson Fold Housing Estate. (October 21st.)

Bradford.—November 7th. Tramways Committee. General stores, including electrical fittings for tramcars, insulating materials, &c. General manager, 11, Forster Square, Bradford.

Bridgwater.—November 23th. Corporation. Pumping machinery. Mr. E. A. Sandford Fawcett, 53, Victoria Street, S.W.1 (deposit £5 5s.).

Burnopfield (Co. DURHAM).—Co-operative Society. Installation of electric lighting at the Sunniside branch. Society's Head Office, Burnopfield.

Edinburgh.—November 9th. Corporation. Two electric ambulance lifts for the Western General Hospital. Mr. E. J. MacRae, city architect.

Egypt.—CAIRO.—December 17th. Ministry of the Interior. Overhead and underground distribution network for the town of Fikria. (A.X. 11552.)*
December 20th. Power station and overhead distribution network for the town of Fagus. (A.X. 11550.)*
December 14th. Ministry of Public Works. 32-kW oil engine driven generator set for the Marouf power station. (A.X. 11551.)*

Farnworth.—November 8th. Electricity Department. A.c. house service meters. (See this issue.)

Glasgow.—November 7th. Corporation. Electric lighting installation at South Chester Street re-housing and intermediate scheme. General manager, Electricity Department, 75, Waterloo Street.
November 12th. Public Assistance Department. Stores, including electrical fittings for various institutions. Contracts Department, 265, George Street, Glasgow.

India.—NEW DELHI.—November 17th. Flame-proof v.i.r. cables. (A.X. 11560.)*

Irish Free State.—DUBLIN.—November 7th. Dublin United Tramways Co. (1896), Ltd. Stores, including cables, car fittings, lamps, electrical fittings, &c. Mr. G. Marshall Harriss, general manager, 59, Upper O'Connell Street, Dublin (form of tender, 2s. 6d.).

London.—FULHAM.—November 18th. Borough Council. One 120-ton and one 15-ton overhead electric travelling cranes. Messrs. Preece, Cardew & Rider, 8, Queen Anne's Gate, S.W.1 (deposit £5).

Manchester.—November 5th. Electricity Department. Substation switchboards and water-softening plant. (October 21st.)

Newcastle-upon-Tyne.—November 23rd. Corporation. One 30-ton and one 5-ton electric travelling gantry cranes. City engineer, Town Hall.

Seaford.—November 12th. Urban District Council. Automatic electrically driven centrifugal pumps. Surveyor, Council Offices.

South Africa.—JOHANNESURG.—December 19th. South African Railways and Harbours. Manual telephone exchange for Durban. (A.X. 11558.)*

Swansea.—November 14th. Electricity Department. Structural steelwork for Tir John North power station. Messrs. Preece, Cardew & Rider, 8, Queen Anne's Gate, S.W.1 (deposit £5 5s.).

Wadsley (near Sheffield).—November 17th. West Riding Mental Hospitals Board. Wiring for electric lighting installation in females' dining hall at the Wadsley Mental Hospital. Mr. E. H. Burton, architect to the Board, Wakefield (deposit £1).

Walsall.—November 10th. Transport Committee. Fifteen double-deck trolley-buses.

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1

Contracts Closed

Cardiff.—Electricity Committee. Recommended. Switchgear.—Metropolitan-Vickers Electrical Co., Ltd. (£10,265); Brookhirst Switchgear, Ltd. (£7,885).

Dewsbury.—Baths Committee. Accepted. Rewiring baths (£141).—Brown & Senior.

Durham.—County Education Committee. Accepted. Electric lighting installations in schools: Chester-le-Street, R. Robson; Annfield Plain, T. W. Atkinson; South Moor Greenland School, Law & Burns; Rushyford, Sleigh & Wood; Cockfield and Haverton Hill, T. B. Watson.

Glasgow.—Corporation. Education Committee. Accepted. Electrical work at school drill hall (£80).—Kennedy Stark & Co.

Magistrates Committee. Accepted. Alterations to electric lighting in the Bridgeton Registration Office.—Grindlay, Ross & Co.

Hornsey.—Housing Committee. Recommended. Wiring flats at North Hill (£160).—Alpha Manufacturing & Electrical Co., Ltd.

Leicester.—Tramways Committee. Accepted. Thirty tramcar motors (£175 each).—British Thomson-Houston Co., Ltd.

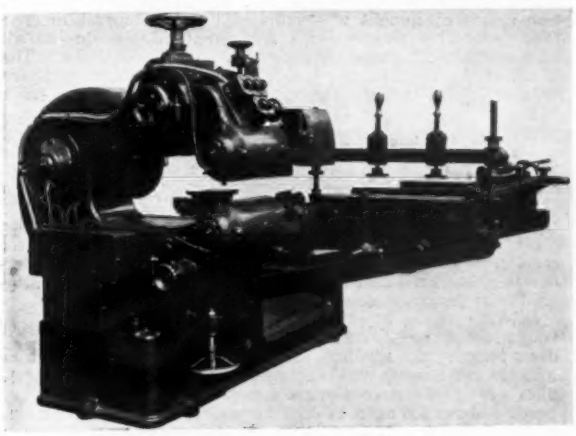
London.—PADDINGTON.—Highways Committee. Recommended. Traffic signals (£242).—Wardle Engineering Co., Ltd.
SOUTHWARK.—Highways Committee. Recommended. Traffic signals (£317).—Automatic Electric Co., Ltd.

Manchester.—Corporation Public Health Committee. Accepted. Passenger bed lift for the Withington Hospital and Institution.—Etchells, Congdon & Muir, Ltd.
Electricity Committee. Accepted.—Annual contract for 6,600-V switchgear.—Ferguson, Pailin, Ltd. Six 6,600-V switchgear panels.—Harland Engineering Co., Ltd.

Rotherham.—Electricity Committee. Accepted. Cable (£4,660).—Callender's Cable & Construction Co., Ltd.

Salford.—Electricity Committee. Recommended. Transformers for twelve months at schedule prices.—Metropolitan-Vickers Electrical Co., Ltd.

Sunderland.—Corporation. Accepted. Electrical equipment for twelve months:—Meters: Edison Swan Electric Co., Ltd.; Ferranti, Ltd. Cables: British Insulated Cables, Ltd.; Pirelli-General Cable Works, Ltd.; Derby Cables, Ltd.; Mersey Cable Works, Ltd. Lamps: General Electric Co., Ltd.



A single-ended tenoning machine with five built-in stator and rotor units in special housing (See "The Integral Electric Drive," page 667)

Wallasey.—Electricity Committee. Recommended. Alterations to combustion chambers of two boilers (£5,000).—Simon-Carves, Ltd. Ash elevator chain (£600).—Edward Bennis & Co., Ltd. Pipes to supplement feed-water mains at generating station (£105).—Stewarts & Lloyds, Ltd. New regulator for alternator sets (£154).—Metropolitan-Vickers Electrical Co., Ltd.

Forthcoming Events

Association of Mining Electrical Engineers (South Wales Branch).—Saturday, November 5th. South Wales Institute of Engineers, Cardiff. 6 p.m. "Some Criteria of Line Insulator Efficiency." Mr. R. C. Andersen.

Institution of Electrical Engineers.—Monday, November 7th. Institution, London. 7 p.m. Informal meeting. Discussion on "The Present Depression—Is Electricity the Way Out?" Opened by Mr. J. F. Shipley. (*Meter and Instrument Section*). Friday, November 4th. 7 p.m. Chairman's address. Mr. R. S. J. Spilsbury. (*North-Eastern Students' Section*).—Friday, November 4th. Armstrong College, Newcastle-upon-Tyne. 7.15 p.m. "Ether and Electrons." Mr. V. H. Grady. (*Mersey and North Wales (Liverpool) Centre*).—Monday, November 7th. University, Liverpool. 7 p.m. "The Work of Oliver Heaviside." Dr. W. E. Sumpner. (*North Midland Centre*).—Tuesday, November 8th. Hotel Metropole, Leeds. 7 p.m. "Metal-Clad Switchgear, Automatic Protection, and Remote Control, with special reference to developments during the last seven years." Mr. H. W. Clothier. (*Scottish Centre*).—Tuesday, November 8th. Institution of Engineers and Shipbuilders in Scotland, Glasgow." 7.30 p.m. "The Electric Lighting of Buildings." Mr. A. B. Read and Dr. J. W. T. Walsh. (*North-Western Students' Section*).—Tuesday, November 8th. Engineers' Club, Manchester. 7.15 p.m. "Heating of Insulated Cables." Mr. J. H. Pirie. (*Hampshire Sub-Centre*).—Wednesday, November 9th. Municipal College, Portsmouth. 7.30 p.m. "The Design of a Distribution System in a Rural Area." Messrs. E. W. Dickinson and H. W. Grimmett. (*Dundee Sub-Centre*).—Thursday, November 10th. University College, Dundee. 7.30 p.m. "The Lubrication of Steam Turbines." Mr. R. Gledhill. (*London Students' Section*).—Friday, November 11th. Institution, London. 6.15 p.m. "Some of the Less Well-known Methods of Electric Propulsion." Mr. R. J. Eldred.

Electrical Power Engineers' Association (London Local Group).—Tuesday, November 8th. Junior Institution of Engineers, London. 7.15 p.m. "Insulator Reliability in Service." Mr. R. C. Anderson.

Illuminating Engineering Society.—Tuesday, November 8th. G.E.C. Research Laboratories, Wembley. 7 p.m. "Luminous Discharge Tube Lighting." Mr. C. C. Paterson.

Edinburgh Electrical Society.—Monday, November 7th. Philosophical Institution, Edinburgh. 8 p.m. "Modern Principles of Shop and Factory Lighting." Mr. Francis.

Royal Society of Arts.—Wednesday, November 9th. Adelphi, W.C. 8 p.m. "New Developments in Colour Cinematography." Mr. T. Thorne Baker.

Association of Supervising Electrical Engineers.—Wednesday, November 9th. Magnet House, Kingsway, W.C. 7.15 p.m. "Recent Developments in Lift Equipment." Mr. J. H. Meacock.

Association of Mining Electrical Engineers (London Branch).—Thursday, November 10th. Junior Institution of Engineers, London. 6.45 p.m. Presidential address. Mr. H. H. Spencer. (Postponed from November 1st.)

Junior Institution of Engineers.—Friday, November 11th. Institution, London. 7.30 p.m. Annual general meeting.

Notes

A 1,500-kW Rectifier at Ilford

The Town Hall sub-station of Ilford Corporation was officially opened yesterday by the Mayor, Councillor Major A. Young. It contains a 1,500-kW steel-tank mercury-arc rectifier, with transformer, 150-kW balancer and switch and control gear. The entire equipment was supplied by the General Electric Co., Ltd. This plant, which will eventually be duplicated, converts 6-kV, 3-phase, 50-cycle a.c. to 470/500-V d.c. The h.v. switchgear consists of a four-panel truck cubicle board with duplicate bus bars, two panels for looping in, one for a radial feeder, and the fourth for the rectifier.

The rectifier may have to carry 3,750 A for two hours, but water-cooled anode radiators are not installed, owing to the heat-resisting properties of the seal, which has a coefficient of expansion similar to that of iron. The plant may be controlled either from Ley Street station or automatically. Vacuum is maintained by two pumps in tandem, one of which is kept continuously in operation to maintain the plant ready for service. Voltage is regulated by on-load tap-changing motor-driven gear on the h.v. side of the main transformer. An illustration of the sub-station appears on page 670.

At the opening function Ald. H. G. Odell (chairman, Electricity Committee) invited Dr. C. C. Garrard to give a brief description of the rectifier. The Ilford undertaking (of which Mr. G. F. Gregory is electrical engineer and manager) supplies nearly 27,000 consumers (an increase of 3,219 over last year). About 400 miles of distributing cable, six convertor sub-stations, and twenty-five static sub-stations are in operation.

Electro-Harmonic Societies

The Manchester Electro-Harmonic Society opened its fourteenth season on October 21st with a smoking concert at which the president (Mr. A. Noel Smith, of Messrs. Frederick Smith and Sons) occupied the chair. He was supported by Mr. J. A. Robertson, a past president. The proceedings were heartily enjoyed by a company of 200 members and friends. The membership is maintained and the Society is flourishing. Visitors to Manchester are invited to be present on any of the following dates, at the Waldorf Hotel, Cooper Street: November 11th and December 16th, 1932, January 20th, February 17th, and March 17th, 1933. The Music Committee this season consists of Messrs. H. R. Taylor (hon. sec.), L. Critch, J. D. Nettleton, R. Povey, and J. Moores. A Ladies' Evening (January 28th) takes the place of a dinner dance. Ladies' Evenings have been a successful feature for the last four or five years. Inter visits are again being arranged between the Manchester and Liverpool Societies. These social gatherings are very effective aids to promoting good fellowship between the electrical and allied trades in the two cities. For the next concert (November 11th) an eminent broadcasting soprano, Miss Garba Hall, has been engaged. Both intending members and visitors are referred to the secretary, Mr. C. E. Leak, 10/12, Cateaton Street, Manchester, for fuller particulars.

Under the auspices of the Liverpool and District Electro-Harmonic Society twenty members of the electrical and allied trades competed in bad weather for the "Cryselco" challenge golf cup and other prizes in the golf tournament held on October 26th. Mr. E. G. Pulford, junr., won the trophy with a net score of 81. Three competitors tied for second and two for the third place with net scores of 85 and 88 respectively. Mr. G. P. Dennis (president of the Society) and Mr. J. Mackenzie had the best gross scores, each finishing with 93. Mr. Dennis presided at the lunch which followed the competitions, and in a short speech paid a personal tribute to Mr. W. F. Moir (managing director of Cryselco, Ltd.), and Mr. H. A. Deacon (sales manager). Mr. Moir responded and distributed the prizes, which were given by the Silvertown Co., British Insulated Cables, Ltd., and the St. Helens Cable Co. Mr. K. R. Mackley, of Cryselco, Ltd., Liverpool, who is secretary for the competitions, is chairman of the Electro-Harmonic Society, which held its first social event of the season on Friday last, October 28th. This took the form of a dinner and smoking concert at the Carlton Rooms, Liverpool. The concert was up to the usual high standard. Social meetings are being held monthly throughout the winter season excepting in December. Mr. W. A. Sloane, 24, Preeson's Row, Liverpool, is hon. secretary and he invites applications for membership from those connected with the electrical and allied trades.

The Need for Courage and Enterprise

The president, Mr. Walter Riggs, occupied the chair at the monthly luncheon of the Batti-Wallahs' Society at the Hotel Metropole, London, on November 1st. Mr. J. S. Highfield, immediate past president, was the principal guest, and he addressed the gathering on "Engineering in Seafaring." He thought that progress in engineering and science had been so swift that the ordinary man needed time to catch up with it. The modern luxury ship could be described as a machine which provided the traveller, at the touch of a button, with all his needs. The sense of security and certainty one had on board ship was the gift of the engineer, but was this entirely to the good? People had grown to fear the loss of what little security had been left them. Millions were spent in insurance, but security could not be obtained without taking risks. In the old days everyone had a job of work to do, hand skill was appreciated, and risks were run.

The engineer had made things easier for the many, but much harder for the few, and without patience nothing would be achieved. They wanted to recapture that delightful sense of taking risks, and to put into business some of that enterprise which made airmen and motor-car racers do "that little bit extra." One could not expect the fruits of business enterprise to be taken and properly administered by someone who had had nothing whatever to do with their winning. Patience was needed and courage to go forward without fear.

Sir Hugo Hirst, Bt., in proposing a vote of thanks, remarked that one of the things from which we were suffering was the fact that the four war years had produced inventions which normally it would have taken twenty-five years to absorb. Life still had something to offer if they would go out after it courageously.

The Norwich Extensions

Last week we gave a technical description of the new plant installed at Thorpe power station, Norwich. The opening ceremony on October 27th was performed by Mr. F. M. Long, who was until the end of last June the Norwich City electrical engineer, and was mainly responsible for the installation. Those present included Messrs. W. W. Lackie (Electricity Commissioner), P. G. Campling (manager, East Anglian area, Central Electricity Board), who started his career with the Norwich undertaking, P. E. Rycroft (borough electrical engineer, Great Yarmouth), W. Frisby (borough electrical engineer, Colchester), A. J. Waring (electrical engineer, Felixstowe U.D.C.), and B. G. Drummond (East Anglian Electricity Supply Co.).

Col. Granville Duff, the chairman of the Norwich Electricity Committee, expressed his pleasure at seeing so many engineers from other undertakings present. Mr. V. A. Pask, the present city electrical engineer, gave a brief description of the new plant, and said that during the past five years the Corporation's consumers and the amount of energy sold had more than doubled. The Corporation supplied about 36,000 consumers in an area of 700 sq. miles. The weekly wage-earning class of consumer was adopting electricity, not only for lighting, but also for cooking and heating. More than a hundred new users of electricity for cooking purposes were being connected up every month, and water heating was also making rapid strides. At the present time eighty per cent. of the houses in Norwich were connected.

The Lord Mayor (Sir Ernest White) paid a glowing tribute to Mr. Long for his thirty years' work for the Corporation. Mr. Lackie commended the liberal and progressive policy of the Norwich Corporation.

A Subterranean Power Station

In the article bearing this heading in our issue of October 21st it was stated that the alternators were built by "the Alsthom and A.E.C. concerns"—the latter is, of course, the A.E.G.

Chartered Institute of Patent Agents

The jubilee of the Chartered Institute of Patent Agents was celebrated at the Hotel Victoria, W.C.2., on October 26th. The dinner, which is an annual affair, was on this occasion followed by a dance and a departure from precedent was made in inviting ladies to the function. Sir Wm. S. Jarratt (Comptroller-General of Patents), proposing the toast of the Institute, said that if necessity was the mother of invention a good patent law was its father. The new Patents and Designs Act included provisions which would make it the equal of American and German law. He hoped that it would remove "the ambiguous phrase," and its general features should greatly encourage manufacturers and enable patents to be taken out much more easily.

Mr. F. Gilbert Brettell (president) responding, pointed out that the trades in which there was now any semblance of success were those which had profited from the direct growth of invention. The objects of the Institute were to: (1) improve the law; (2) regulate the conduct of patent agents; and (3) provide opportunities for discussion, in which information was very readily exchanged.

In a witty speech Mr. A. A. Thornton proposed the health of "Our Guests," to which the replies by the Hon. Sir Harry T. Eve and Dr. Leslie Burgin (Parliamentary Secretary to the Board of Trade) were also in happy vein.

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

J.I.E. Awards.—Among the awards made by the Council of the Junior Institution of Engineers for papers and lectures delivered during the session which terminated on September 30th are the following:—Institution gold medal to Mr. D. MacFarlane for his paper on "Ventilation and Cooling of Turbo-Alternators," and the Vickers gold medal and prize to Mr. S. J. Clifton for his paper "Automatic Combustion Control." Awards of local section silver medals have been made to Mr. H. Stone (Sheffield Section) for a paper on "The Development of Water Power," and Mr. J. H. L. Tucker (North-Eastern Section) for his paper on "Modern Power Station Design."

Mr. H. Faraday Proctor was presented with a silver cigarette box, a gramophone pick-up and records by the employés of the Bristol Electricity Department at a dinner last week upon the occasion of his retirement from the position of city electrical engineer.

Mr. H. L. Kirby Johnson, managing director of the Martindale Electric Co., Ltd., was elected to the Hendon Town Council on Tuesday last as an Independent member.

Mr. Martin Insull, according to a *Reuter* message from Ottawa, has engaged counsel from Chicago and also in Canada to protect him against extradition. Another *Reuter* message states that Governor Emerson has signed a requisition for a presidential warrant for the extradition of **Mr. Samuel Insull** from Greece and Mr. Martin Insull from Canada on charges of embezzlement. The Toronto correspondent of the *Financial News* reports that the Chicago Court has refused to allow creditors to take over the assets of Middle West Utilities for distribution, indicating that it will continue to seek a reorganisation of the property.

Mr. D. J. Thomas, A.M.I.E.E., of 2, St. Andrews Place, Cardiff, has been appointed, as from November 1st, sole selling agent for Switchgear & Cowans, Ltd., for the counties of Monmouth, Glamorgan, Carmarthen, Brecon, Cardigan, Pembroke, Gloucester west of the river Severn, and the City of Gloucester.

Professor J. Hollingworth, D.Sc. (Lond.), M.A. (Cantab.), M.I.E.E., has been appointed to the Chair of Electrical Engineering in the University and in the College of Technology, Manchester, in succession to Prof. Miles Walker, who has retired. Prof. Hollingworth has been scientific assistant at the Radio Research Station of the Department of Scientific and Industrial Research, Slough, since 1928, and from 1921 to 1928 was on the staff of the National Physical Laboratory, Teddington. Prof. Hollingworth was for some time on the staff of the College, first as an assistant lecturer and later as lecturer in electrical engineering. His researches include: "A Physical Interpretation of the Bessel Function of Zero Order," "The Measurement of the Electric Intensity of Received Radio Signals" and "The Propagation of Radio Waves" (for which he was awarded premiums by the Institution of Electrical Engineers), "The Polarisation of Radio Waves," "A Long Wave Radio Intensity Measuring Set," "Some Characteristics of Short Wave Reception," and "A Portable Radio-Intensity Measuring Apparatus for High Frequencies." During the War, Prof. Hollingworth was engaged at the R.N.A.S. air station, Cranwell, and later at the R.A.F. Experimental Establishment, Biggin Hill.

[*Elliott and Fry.*

Prof. J. Hollingworth

Ealing Corporation has approved the following appointments in the Electricity Department:—Showroom superintendent: **Mr. G. S. Bone,** of Barrow-in-Furness Electricity Department; consumers' engineer: **Mr. S. F. Osborne,** of the Bedfordshire, Cambridgeshire and Hunts Electricity Co.; receptionist: **Mr. A. C. Hazel,** of the West Devon Electric Supply Co., Ltd.; and cook-demonstrator: **Miss J. M. Fright,** of Barnes.

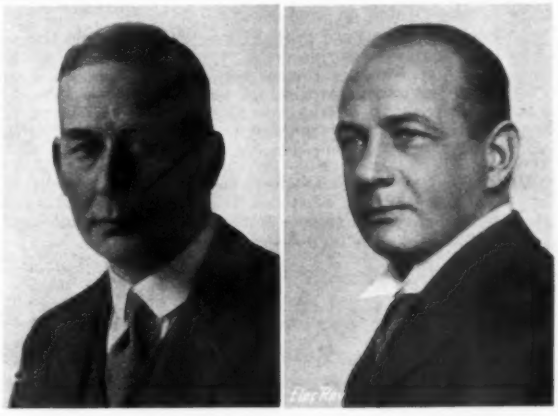
Mr. D. G. Jones, M.I.E.E., retired from the position of chief electrical engineer with Messrs. Thos. Firth & John Brown, Ltd., Sheffield, on October 31st, after holding the post for more than thirty-four years. The friends whom he has made during his business career will wish him a long and enjoyable retirement from his activities in the electrical engineering world. On his retirement Mr. Jones was presented with a chiming timepiece, and a case of silver spoons was given to Mrs. Jones. Owing to the absence of Mr. A. J. Grant, managing director, the presentation was made by Mr. J. F. Bridge, secretary of the company. Mr. Jones's present address is Wood Lane Cottage, Ashopton, nr. Sheffield.

Mr. A. Burgess, M.C., B.Sc., general sales manager of Worthington-Simpson, Ltd., has been elected an additional director. Mr. Burgess has previously represented the Worthington interests in Brussels, Paris, Buenos Aires, etc.

Mr. G. N. Guest, formerly managing director of Messrs. Hollings & Guest, Ltd., and Messrs. Hands & Sons, Ltd., has joined Tangyes, Ltd.

Mr. S. J. Dalmon, partner in the firm of P. Dalmon and Sons, electrical engineers, Teville Road, Worthing, was married on October 22nd to Miss R. H. Downer, of Worthing.

The Marchese Marconi has been awarded the Goethe Medal for Science and Art, which was established by President von Hindenburg in commemoration of the Goethe Centenary this year.



[*Lafayette* [*Elliott and Fry.*

Past and present city electrical engineers of Norwich—Messrs. F. M. Long and V. A. Pask

Mr. H. H. Spencer, president of the Association of Mining Electrical Engineers, was to have given his presidential address on Tuesday last in London. We regret to learn, however, that illness prevented him from attending. The meeting has been postponed until November 10th, when it is hoped Mr. Spencer will be well enough to deliver his address. The meeting will be held at the Junior Institution of Engineers, 39, Victoria Street, S.W., at 6.45 p.m.

Obituary

Mr. C. H. Gray.—We deeply regret to record the death of Mr. Christian Hamilton Gray, a joint managing director, and, from 1922 to 1928, the chairman of the India Rubber, Gutta Percha & Telegraph Works Co., Ltd., which occurred on October 30th at Hurst House, Abbey Wood. Mr. Gray, who was in his 74th year, was ill only a short time; pneumonia was the cause of death. He was the fourth of the five sons of Mr. Matthew Gray, who in conjunction with the late Mr. S. W. Silver, was responsible for the foundation and development of the Silvertown Company, which began its operations in the year 1864. With the death of Mr. C. H. Gray, the last of the sons has passed away. Three of them, Messrs. Robert K. Gray, Mr. W. E. Gray, and Mr. C. H. Gray were at one time or another managing directors, while the second son, Mr. M. H. Gray, devoted himself to submarine telegraph matters and was an extraordinary director, and Mr. J. Kaye Gray devoted his attention chiefly to the Persan works. Mr. C. H. Gray was born at Dalmarnock in April, 1859, and after his education at University College School, London, he went to Paris and Spain to study languages. For some time afterwards he was at Algiers engaged in shore-end cable testing work, and later several years were spent at the Persian works of the company. In 1885 he came to Silvertown and was appointed

[*Rotogravure.*

The late Mr. C. H. Gray

manager of the rubber departments, and eventually took over the proofing, ebonite and gutta percha departments. He took charge of this side of the business and controlled it for some thirty years. At one period while he was thus engaged two of his brothers were running the submarine cable and the electric lighting departments respectively at Silvertown—Mr. R. K. Gray the former, and Mr. W. E. Gray the latter. When Mr. Robert Kaye Gray died in 1913, Mr. C. H. Gray took over the joint managing directorship at the head office in London, with Mr. W. E. Gray, who died early last year. He was closely identified with the Palmer tyre business from the inception of that section of the company's activities, and was a director of the Palmer Tyre, Ltd. Briefly stated, his work was directly connected with the technical progress of rubber manufacture for a period of nearly fifty years. During the war Mr. Christian Gray was awarded the Cross of the Chevalier of the Legion of Honour for special services rendered to France in connection with submarine cable matters. He conceived the idea of cutting and diverting the German cables in the North Sea and carried out that remarkable undertaking, which was considered impracticable in the highest circles across the Channel. Mr. Gray married in 1891 at Kingston, Ontario, Sophie Tupper Cameron, grand-daughter of Sir Charles Tupper, Bart., the great Canadian statesman. The funeral took place at St. Michael's Church, East Wickham, Welling, Kent, on Wednesday.

Readers who have been brought into touch at some time or other with members of this distinguished family will, we believe, desire to associate themselves with the Editors of the ELECTRICAL REVIEW in expressing deep sympathy with his widow and with Miss Gray, his sister, in their bereavement and with the Silvertown Company in the loss of the last of the chiefs carrying the honoured name.

Mr. F. G. Brown.—The sudden death is announced, at the age of 60 years, of Mr. Frederick G. Brown, who had for 22 years been in business as an electrician at 166, Bedford Road, Kempston.

Major W. L. Maxwell.—The death has occurred at Bulawayo of Major Walter Lockhart Maxwell, electrical engineer in the chief mechanical engineer's department of the Rhodesia Railways. He was 57 years of age and served in the South African campaign and the Great War.

Mrs. Harcourt-Williams.—The Electrical Association for Women has suffered a great loss in the death of Mrs. J. Harcourt-Williams, who passed away very suddenly on October 26th. She was one of the founders of the Manchester and Salford Branch of the Association, of which she was joint hon. secretary, and she took a great interest in the work, not only in Lancashire but throughout the country.

Mr. J. Shaw.—The death occurred on October 27th of Mr. John Shaw, of Orchard Road, St. Annes-on-Sea, partner in the firm of Messrs. Shaw and Robinson, Preston, and formerly consulting electrical engineer with the British Thomson-Houston Co., Ltd., at Manchester. He retired a year ago and entered the Preston business in partnership with a nephew.

Mr. V. G. Apple.—The death recently occurred at Dayton, U.S.A., at the age of 58 years, of Mr. Vincent G. Apple, who is claimed to have been the originator of electric lighting and starting for motor vehicles. The Apple Electric Co., which the inventor founded many years ago, produced a complete dynamo lighting system as far back as 1907.

Dr. W. Garnett.—Dr. William Garnett, the well-known mathematician and authority on technical and secondary education, passed away on November 1st at the age of eighty-one years. He was first demonstrator of physics in the Cavendish Laboratory, Cambridge, under Prof. James Clerk Maxwell, and was famous as a lecturer, educational adviser, and author. He was joint author of a biography of Clerk Maxwell.

Will.—Mr. J. H. Wilson, of Dunragit, Wigtownshire, a director of the Eastern Extension, Australasia and China Telegraph Co., left £18,904 (net personalty nil).

Financial Section

New Companies, Return of Share Capital, Debenture Charges, Reports of Electrical Companies. Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

G. S. Mottram & Partners, Ltd.—Private company.—Registered October 27th. Capital, £2,000 in £1 shares. Objects: To carry on the business of agents and representatives of any person, firm or company factoring or manufacturing electrical apparatus and machinery, and to carry on the business of engineers, founders, smelters, smiths, &c. The directors are: G. C. Usher, Abbotts Grange, Hemel Hempstead (director International Combustion, Ltd.); G. H. Wilson, Belcombe, Salingham, Nethergate, Norfolk (director Laurence, Scott & Electromotors, Ltd.); G. J. Scott, Windgates, Acle, Norfolk (director Laurence, Scott & Electromotors, Ltd.); V. Young, 13, Green Hills Park, New Barnet, Herts (director Mining & Industrial Equipment, Ltd.); G. S. Mottram, 55, Lon Isa, Cardiff (director G. W. Mottram, Ltd.); and S. T. Lord, 15, Dumfries Place, Cardiff. Secretary: S. T. Lord. Registered office: 15, Dumfries Place, Cardiff.

Wandleside Cable Works, Ltd.—Private company. Registered October 28th. Capital, £20,000 in £1 shares. Objects: To carry on the business of electrical, mechanical, hydraulic and general engineers and contractors, manufacturers of and dealers in all kinds of cables, wires, insulating and waterproofing materials, &c. The subscribers are: A. MacGregor, 80, Ashburton Avenue, Croydon, and H. W. Huxham, 19, Kellet House, Tankerton Street, W.C.1. Solicitors: Cardew, Smith & Ross, 27, Ely Place, E.C.1.

Burrell Radio, Ltd.—Private company. Registered October 24th. Capital, £700 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in radio transmitting and receiving sets and accessories, electrical apparatus, &c. The permanent directors are: A. B. Cook and Mrs. S. M. Cook, both of 1, Odessa Road, Harlesden, N.W.10. Registered office: Halifax House, 62-4, Moorgate, E.C.2.

Radio Renovators, Ltd.—Private company. Registered October 27th. Capital, £100 in £1 shares. Objects: To carry on the business of designers, manufacturers, engineers, consultants, and the like in connection with radio-telephony or telegraphy, &c. The first director is R. F. Sheppard, 140, Cholmley Gardens, N.W.6. Registered office: 12, Holborn Viaduct, E.C.

Collier Electric Co., Ltd.—Private company. Registered October 27th. Capital, £100 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in signs and appliances for display advertisement, electricians, engineers, &c. The subscribers are: G. V. Despard, 54, Castlebar Road, Ealing, W.5, and R. Fulton, 23, Randulph Mews, W.1. Registered office: 2a, Alexandra Road, Croydon.

H. R. Bishop, Ltd.—Private company. Registered October 26th. Capital, £100 in £1 shares. Objects: To carry on the business of manufacturers, importers and exporters of and dealers in radio receiving and transmitting valves, electric discharge tubes with rarefied or varified atmospheres, X-ray valves and tubes, &c. The permanent directors are: J. S. Lowden, 70a, South Audley Street, W.1, and J. Lowden, Drayton Lodge, Liverpool Road, Kingston Hill, Surrey. Registered office: 4, Royal Arcade, Old Bond Street, W.1.

Neonbar Signs, Ltd.—Private company. Registered October 27th. Capital, £100 in £1 shares. Objects: To carry on the business of sign writers, manufacturers of and dealers in illuminated signs of all kinds, &c. The directors are: R. A. P. Barton, 1, Albert Road, Wimbledon Park, S.W.; G. H. R. Barton, 19a, East Heath Road, Hampstead, N.W.; and R. Barton, Ormonde House Hotel, Belsize Park, N.W. Registered office: 36, Red Lion Square, W.C.1.

Floodlighting and Fittings, Ltd.—Private company. Registered October 31st. Capital £2,000 in 1,900 shares of £1 and 1,000 shares of 2s. each. Objects: To acquire the business of an electrical engineer carried on by H. A. Reeves at 67, Shepherdess Walk, London. The subscribers are: H. A. Reeves, 12, The Broadway, Mill Hill, N.W.7; and H. S. M. Herbert, "Charlmar," 23, Boundary Road, Wallington, Surrey. Registered office: 13, Finsbury Square, E.C.2.

Plant Maintenance, Ltd.—Private company. Registered October 28th. Capital, £1,000 in £1 shares. Objects: To carry on the business of electrical and mechanical engineers and contractors, &c. The first directors are: G. C. Tomkins, "Redthorne," Streetsbrook Road, Shirley, Warwickshire, and C. H. Pearson, Highfield, Station Road, Henley in Arden, Warwickshire. Solicitors: Loxton & Co., Walsall.

Phillips & Dart, Ltd.—Private company. Registered October 31st. Capital £100 in £1 shares. Objects: To carry on the business of electrical, wireless, mechanical and general engineers, manufacturers of, agents for, and dealers in electrical, wireless and television apparatus, &c. The directors are: F. H. Feest, 84, Marine Parade, Worthing; and F. Dart, "Guildown," Findon Road, Worthing. Registered office: 10, Shelley Road, Worthing, Sussex.

Scientific Supply Stores (Wireless), Ltd.—Private company. Registered October 28th. Capital £2,000 in 6,400 ordinary shares of 5s. each and 400 preference shares of £1 each. Objects: To acquire the business of an electrical engineer, designer, manufacturer, repairer of and dealer in wireless, electrical, mechanical and acoustic apparatus, &c., carried on by W. H. Allen at 126, Newington Causeway, S.E. The directors are: W. H. Allen, Bourne Hurst, Hamm Court Estate, Weybridge; and J. E. Seabrook, 54, Gresham Road, Stockwell, S.W.9. Registered office: 126, Newington Causeway, S.E.

Returns of Electrical Companies

Liskeard Gas & Electricity Co., Ltd.—Satisfaction (1) to the extent of £300, on July 1st, 1932, of debentures authorised March 28th, 1929, and registered May 9th, 1929, and (2) to the extent of £8,000 on October 1st, 1932, of debentures authorised October 28th, 1925, and registered January 25th, 1926. (According to the register of mortgages, the debentures registered May 9th, 1929, originally secured £6,000, and the debentures registered January 25th, 1926, originally secured £8,000.)

Launceston & District Electric Supply Co., Ltd.—Satisfaction in full on October 1st, of debentures authorised July 24th, 1919, and registered March 9th, 1920. (According to the register of mortgages, the debentures registered March 9th, 1920, originally secured £3,500).

Northwood Electric Light & Power Co., Ltd.—Capital, £60,000 in 15,000 preference and 45,000 ordinary shares of £1. Return dated June 2nd, 1932. 6,880 preference and 45,000 ordinary shares taken up. £47,655 paid on 6,880 preference and 40,775 ordinary shares. £4,225 considered as paid on 4,225 ordinary shares. Mortgages and charges: £30,162 10s.

Partridge & Mee, Ltd.—Capital, £4,000 in £1 shares. Return dated July 5th, 1932. 2,405 shares taken up. £2,405 paid. Mortgages and charges: £3,000.

Electric & General Industrial Trusts, Ltd.—Satisfaction to the extent of £2,300, on October 17th, of debentures authorised July 10th, 1930, and registered July 14th, 1930.

Bela Radio, Ltd.—Debenture, dated October 8th, to secure £1,000, charged on the company's property, present and future, including uncalled capital. Holder: Mrs. E. G. Hodgson, Belgrave Lodge, Marine Drive, Bridlington.

"New Era" Time & Telephone Systems, Ltd.—Two mortgages, dated August 30th, 1932, to secure £500 each, charged on contracts for the hire of electrical equipment, &c. Holders: New Era Installation Trust, Ltd., 30, St. Ann Street, Manchester. (Registered October 20th, by permission of the Court.)

Eastern Electric Installation Co., Ltd.—Particulars filed of debentures not exceeding £1,000 authorised August 5th, 1932, charged on the company's property, present and future, including uncalled capital, the amount of the present issue being £100.

Wakelins Wireless Co., Ltd.—Further charge on 66, Norwich Road, Ipswich, dated October 11th, 1932, to secure £650 (inclusive of £536 16s. 3d., owing in respect of mortgage dated August 2nd, 1928, already registered). Holders: Ipswich Permanent Benefit Building Society, Ltd.

Betterset Radio, Ltd.—Debenture, dated October 21st, to secure £550, charged on the company's property, present and future, including uncalled capital. Holder: Rev. E. W. D. Penfold, The Vicarage, Durrington, Worthing.

British Pix Co., Ltd.—Satisfaction to the extent of £1,000 on October 1st, of debenture dated July 5th, 1932, and registered July 5th, 1932.

Acton Battery Co., Ltd.—The company's nominal capital has been increased by the addition of £1,350 beyond the registered capital of £750. The additional capital is divided into 1,350 6 per cent. participating preference shares (not redeemable) of £1 each.

Hellesens, Ltd.—The company's nominal capital has been increased by the addition of £80,000 beyond the registered capital of £80,000. The additional capital is divided into 56,000 "A" ordinary and 24,000 "B" ordinary shares of £1 each.

Paignton Electric Light & Power Co., Ltd.—The company's nominal capital has been increased by the addition of £20,000 in £1 ordinary shares beyond the registered capital of £70,000.

City Notes

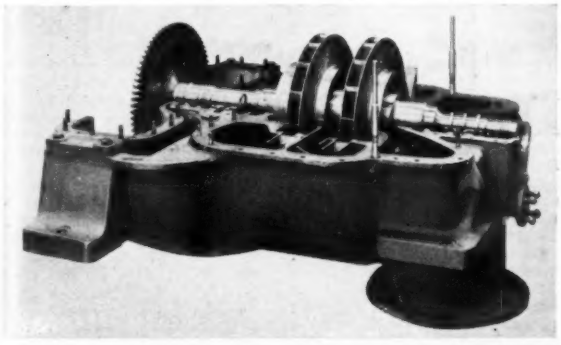
Drake & Gorham, Ltd., report that after payment of debenture interest there was a net profit for the year ended June 30th last of £532, as compared with £8,242 in the preceding year; to this is added £3,294 brought in, making £3,826 available. It is proposed to pay a dividend of 2 per cent. (against 5 per cent.), and to carry forward £1,326. During the year £1,585 of the 5½ per cent. debenture stock was redeemed in accordance with the terms of the trust deed, and in addition a further £1,623 of this stock was purchased. The report states that the results reflect the trade depression which has affected business throughout the world, and it is only the diversity of the company's activities which has made it possible to write off a portion of certain departmental development expenses and to show a profit. Many important installations were carried out in the course of the year, and work continues to proceed satisfactorily on the more protracted contracts such as the Bank of England and the head offices of the Prudential Assurance Co. Among the new orders received, mention is made of Messrs. Glyn, Mills & Co., Ltd., the Leyton Town Hall, the Masonic Peace Memorial, and the Metropolitan Hospital, Dalston. Messrs. A. C. Read, F. Jarrett, H. W. Scutts, and Major P. A. Smith have been appointed employé managing directors of the company.

The Madras Electric Tramways (1904), Ltd., was to hold a meeting on Wednesday last to submit a proposal to increase the capital from £200,000 to £300,000 by the creation of 25,000 preference and 75,000 ordinary shares of £1 each. The new preference shares will rank *pari passu* with the existing 125,000 six per cent. cumulative preference shares.

The Craigpark Electric Cable Co., Ltd., has announced an interim dividend on the ordinary shares of 4 per cent., tax free (same).

The Madras Electric Supply Corporation, Ltd., is maintaining its interim dividend at 2½ per cent., tax free.

The Adelaide Electric Supply Co., Ltd., has declared a final dividend of 4½ per cent. on the ordinary shares, making 8½ per cent., tax free, for the year (same).



The turbine wheel and impellers of the turbo-blower (See "Oil-engine Operation at Ashford," p. 669)

Stothert & Pitt, Ltd., in their report for the year ended June 30th, show a loss of £18,250, as against a profit of £6,684 in the preceding year, which is reduced to £16,629 by transferring £1,621 from income-tax reserve. The preference dividend for the half-year ended December 31st last absorbed £1,446, and a sum has been taken from reserve to cover this and to write off the loss for the year, leaving £68 to be carried forward. No further preference dividend is recommended. Last year the full preference payment was met and an ordinary dividend of 2½ per cent. was paid.

The Amazon Telegraph Co., Ltd., reports a gross revenue, including £455 provision for income tax no longer required, of £32,452 for the year ended June 30th, as against £43,450 in the preceding year, and working expenses of £25,146 (against £28,901). After providing for income tax and for a loss on investments, there is a net profit of £6,344, which with £4,805 brought in makes £11,149. Reserve receives £5,000 and the balance of £6,149 is carried forward.

The Fife Tramway, Light & Power Co., Ltd., held an extraordinary meeting on October 28th at which resolutions were passed enabling the company to return to the holders of the issued 500,000 ordinary shares of £1 each a total of £125,000, which represented 5s. per share, and to make certain consequent readjustments to the share capital. Particulars of the scheme were published in our issue of October 14th, p. 585.

Ernest F. Moy, Ltd., report a net profit for the year ended December 31st last of £2,033, which with £9,890 brought in makes £11,923 available. The directors recommend an ordinary dividend of 20 per cent., less tax.

The Western Electricity Supply Co., Ltd., reports a net profit for the past year of £79,442, which with £9,724 brought in makes £89,166 available. It is proposed to place £30,000 to reserve (against £20,000), to pay a final ordinary dividend of 7 per cent., making 10 per cent. for the year, plus a bonus of 5 per cent., and to place £3,000 to the staff benevolent fund, leaving £12,666 to be carried forward.

W. T. Henley's Telegraph Works Co., Ltd., has declared an interim dividend on the ordinary shares of 1s. 6d. per share, less tax, as last year.

The Cawnpore Electric Supply Corporation, Ltd., has announced an interim ordinary dividend of 3 per cent. (same) less tax, at 2s. 6d.

Meters, Ltd., has declared an interim dividend on the ordinary shares at the rate of 5 per cent. per annum (same).

The Calcutta Tramways Co., Ltd., has formally announced its intention to redeem its seven per cent. second (registered) debentures on May 15th next at 102, plus interest.

Stocks and Shares

TUESDAY EVENING.

THE present week is a broken one from the purely Stock Exchange point of view, Capel Court being closed on Tuesday, and the Paris Bourse on the first two business days of the week. Next week, the New York Presidential Election will take place, adding another element of restraint to the various factors which are making, at the moment, for quietude in markets. Issues recently made by big borrowers have been taken on satisfactory terms to the latter, evidencing the abundance of money that requires investment employment. The outlook for trade and industry continues to be obscured by a variety of conditions. Uncertainty makes for strength in gilt-edged securities. People decline to put money into stocks and shares, other than those of the safety first rank, at a time when trade and commerce, already dull, are subject to abrupt disturbances in the labour world.

Home Electricity Supply

Central Electricity 4½ per cent. debenture at 105 shows a gain of a point, and the 4½ per cent. debenture stock of the London and Home Counties J.E.A. keeps good at 107. Prices of shares in the list of home electricity companies are well maintained. Charing Cross ordinary have receded 6d. to 31s. 6d., South London ordinary at 31s. are ex the share bonus. Amongst the provincial stocks and shares, Northamptons have lost a little of the florin gain that they secured last week. Lancashire Light and Power eased off to 28s. 9d., Bournemouths to 71s. 3d. Amongst the Scottish shares, Clyde Valley ordinary are ⅛ lower at 31s. 3d. Reference to our share list will point the modest character of the returns which the shares offer at their current quotations. Shares in the provincial undertakings are deemed, however, to possess scope for appreciation by reason of the fact that the dividends are not limited, as in the case of various London electricity supply companies, to a standard level. This 7 per cent. level may be qualified, of course, by the process of profits expansion as time goes on, but we have previously mentioned the impression that, for a year or two, the London companies will rest content with payment of the 7 per cent. to which shareholders now consider themselves to be entitled.

Tube Railway Stocks

Now that four months have gone out of the six that make up the current half-year of the Home Railway companies, it is natural that dividend anticipations should be canvassed. The effect upon the stocks in the electric railway group is favourable, and Underground Electric issues have strengthened to 19s., Central London assented ordinary to 82½. The stock has changed hands several times during the past few days as high as 84½. For the assented preferred ordinary stock, 83½ was given one day last week, when the assented deferred changed hands at 83. It may be of interest to add that in the Central London non-assented trio, the ordinary stock is quoted 55¼, the preferred 51, and the deferred 57½. City and South

London ordinary stands at 54½, London Electric ordinary at 63¾.

Metropolitans have recovered a point to 63 after the bout of mild profit-taking which lowered the price a week ago. The House of Commons passed a resolution, without a division, to carry over the London Passenger Transport Bill to next session. The Minister of Transport advanced sufficiently cogent reasons why this course should be followed for general agreement of the House of Commons to be secured, although certain M.P.s desired to modify the scheme. The Colonial Secretary, in winding up the debate, said that the Bill was in the interests of traffic co-ordination, of shareholders, of the travelling public, and of railway development.

Cables and Wireless

Speculation in Cables and Wireless stocks has subsided to some extent, but the ordinary stock continues in request, and at 29 shows a gain of 2. There is still a good deal of business being done in the three classes. Globe Telegraph and Trust ordinary shares further reacted to 10; the preference hold their recent improvement to 11½. Great Northern Telegraphs are £1 up to 27. American Telephone and Telegraph, following the course of New York industrials as a whole, has risen to 157½, after being 154, while Internationals at 14½ are unchanged on the week. Telephone Properties 8 per cent. preference have been changing hands on the basis of 22s. The ordinary are quoted at 16s. 3d.

The Amazon Telegraph Company, as a result of last year's operations, had £6,344 to the credit of the profit and loss account. It is proposed to carry forward £6,149 to the current year. The nominal price of the £10 shares is 30s. They changed hands at £1 in September last. The shares have had no dividend since November, 1926.

Dollar Stocks

With the Presidential Election taking place next week, interest in stocks and shares on the Wall Street Exchange has waned by reason of the attention now being concentrated upon the fight. The chances are said to favour the return of Mr. Roosevelt and the Democrats. If this change-over were to take place, it is assumed that the more liberal programme of the Democrats, as opposed to that of the Republicans, may be expected to have a revivifying effect upon industry in the United States. At the present time, the various trade statistics which are regarded as pointers to the industrial condition in America are disappointing, and tend rather to quench the optimism which two or three months ago began to make itself felt in the States. This being the case, business in American stocks and shares is now largely professional and semi-professional. The ordinary British investor in the street follows with no more than languid interest the ups and downs in America's popular gambling counters. The good stocks move along no clearly defined path. Consolidated Gas and Electric of Baltimore, one of the sound investment stocks, is up a point this week to 96½. Of the Canadian water power shares, Shawinigans are easier at 17. Power Corporation of Canada at 13½ show no change. Hydro-Electrics remain a dull market around 8¾.

Manufacturing and Equipment Shares

Callenders are better at 3$\frac{3}{16}$, and the company's 6½ per cent. preference shares have risen to 28s. 9d. Ever-Ready shares strengthened to 29s. 6d. Other shares in this group are, however, inclined to be dull. Associated Electrical Industries ordinary eased off to 17s. 6d., British Aluminiums to 26s. 3d., General Electrics to 40s. 9d., Telegraph Constructions to 10½, Enfield Cables to 4$\frac{7}{16}$. There is not a great deal going on in this particular department. The Government's handling of the national finances, the latest example of which is the announced intention to repay the Treasury bills falling due next February, has the effect of giving sound preference shares a fresh impetus towards higher prices. The same considerations apply, of course, to debenture stocks, the supply of which in this particular market is exceedingly limited.

Babcock and Wilcox have gone back to 39s. 6d., and Vickers to 6s. 9d. The shares in this section are disposed to ease off, owing to the absence of business. Nothing fresh of interest has occurred in the rubber market.

Miscellaneous Matters

Shareholders in the Fife Tramway, Light and Power Company have passed the necessary resolutions for the return of 5s. on each £1 ordinary share, amounting altogether to £125,000. At the meeting the chairman stated that, after this distribution had been made, the company will still have cash resources approximating £58,000. The price of the shares is 12s. 6d., and business has been done recently on this basis. The Western Electricity Supply Company increased its profits last year by £9,500, and the directors have declared a dividend of 7 per cent. on the ordinary, making 10 per cent. for the year, plus a bonus of 5 per cent. These distributions are the same as those of a year ago. A fall of ½ lowered Victoria Falls ordinary to 78s. 9d. It is said that a deceased account came into the market. Another reason given was that the rise in the price of the shares to over 4 had tempted sales on behalf of people who had bought considerably lower down. A rise of 5 points in London United Tramways debenture stock brought the quotation to 67. The demand for investment stocks caused a rise of 2 in British Columbia Electric Railway preference. The Brazilian group is quiet, and Brazil Tractions at 12 show a small decline on the week. River Plate Electricity ordinary stock at 159 is 4 points higher.

Share List of Electrical Companies

	Nom.	Approx. Dividend. 1930.	1931.	Price, Oct. 31	Rise or Fall.	Yield p.c. £ s. d.
HOME ELECTRICITY COMPANIES.						
Bournemouth and Poole	1	15	15	71/3	—9d.	4 4 4
Brompton Ordinary	1	8½	8½	31/–	—	4 10 4
Central Electricity 4½% Deb.	Stock	4½	4½	105	—	4 5 7
Charing Cross Ordinary	1	8½	8½	31/6	—	4 7 6
Chelsea	1	8¾	8¾	31/6	—	4 9 0
City of London	1	10	10	43/9	—	4 11 6
Clyde Valley	1	8	7	31/3	—¼	4 9 7
County of London	1	11	10½	50/9	+9d.	4 2 8
Edmundsons' 7% Pref.	1	7	7	29/6	—	4 15 0
Elec. Dis. Yorkshire	1	9	9	41/3	—	4 7 4
Elec. Supply Corporation	1	11	11	55/–	—	4 0 0
Kensington Ordinary	1	8	8	32/6	—	4 6 2
Lancs. Light and Power	1	6½	7	28/9	—9d.	4 17 5
London & Home Counties 4½% Deb. Stock		4½	4½	107	—	4 4 1
London Electric	1	9	9	32/–	—	4 7 6
Metropolitan	1	10	10	48/9	—	4 2 0
Midland Counties	1	7	7	33/9	—	4 3 0
Mid. Elec. Power	1	8	8	35/9	—	4 9 5
North Eastern Electric Ordinary	1	6	6	27/6	—	4 7 3
Do. 7% Pref.	1	7	7	31/–	—	4 10 4
Northampton	1	10	10	48/9	—¼	4 2 0
Notting Hill 6% Pref.	10	6	6	12½	—	4 16 0
North Met. Elec. 6% Pref.	1	6	6	28/6	—	4 4 3
St. James' and Pall Mall	1	8	8	31/–	—	4 10 4
Scottish Power	1	8	8	33/9	—	4 14 10
South London	1	8½	8½	31/-xb	—	4 10 4
Urban Ordinary	1	7	7	35/–	—	4 0 0
Westminster Ordinary	1	8¾	8¾	31/6	—	4 9 0
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	17/6	—	8 11 6
Yorkshire Elec.	1	8	8	40/–	—	4 0 0
HOME RAILS.						
Central London Ord. Assented	Stock	4	4	82½	+1	4 17 0
Metropolitan	,,	3½	2½	63	+1	3 19 4
Do. District	,,	5	4½	64½	—	6 19 6
Underground Electric	1	8	7	19/–	+6d.	7 7 4
TELEGRAPH AND TELEPHONES.						
American Tel. & Tel.	$100	9	9	157½	+4	5 14 3
Anglo-Am. Tel. Pref.	Stock	6	6	104½	—	5 14 10
Do. Def.	,,	1½	1½	26	—	5 15 5
Cables & Wireless 5½% Pref.	,,	5½	2¾	75½	—	3 13 10
Do. A 7½% Ord.	,,	—	Nil	29	+2	—
Do. B ord.	,,	—	Nil	13½	+½	—
Globe Tel. and T. Ord.	10	8½	Nil	10	—½	—
Do. do. Pref.	10	6	6	11½	—	5 4 4
Great Northern Tel.	10	20	20	27	+1	7 8 2
Marconi-Marine	1	15	10	31/3	—	6 8 0
Oriental Telephone Ord.	1	12	12	2½	—	*4 1 8
HOME AND FOREIGN TRAMS, ETC.						
Anglo-Arg. Trams First Pref.	5	—	—	5/–	—	—
Do. do. 2nd Pref.	5	—	—	3/9	—	—
Do. do. 5% Deb.	Stock	—	—	7	—	—
British Electric Traction Def. Ord.	,,	5	5	300	—	—
Do. do. Pref. Ord.	,,	8	8	133½	—	5 19 10
Brazil Traction	100	—	—	12	—½	—
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	102½	+2	4 17 6
London & Sub. Trac. 5% Pref.	1	Nil	Nil	10/–	—	—
London United Tram Deb.	Stock	4	4	67½	+5	5 19 5
Mexico Trams, 5% Bonds	—	5	5	45	—	11 2 2
Mexican Light Common	100	Nil	Nil	12½	—	—
Do. 7% Pref.	100	7	7	20	—	—
Do. 1st Bonds	—	5	5	69½	—	7 11 10
Victoria Falls Ord.	1	15	15	78/9	—½	3 16 2
Yorkshire (West Riding)	1	Nil	Nil	5/–	—	—
MANUFACTURING COMPANIES.						
Assoc. Elec. Ord.	1	6	4	17/6	—9d.	4 11 5
Do. Pref.	1	8	8	30/–	—	5 6 8
Babcock & Wilcox	1	14	14	39/6	—6d.	—
British Aluminium Ord.	1	10	5	26/3	—¼	3 16 1
British Insulated Ord.	1	15	15	67/6	—	4 9 4
Brush Ord.	Stock	5	Nil	35	—	—
Callender's	1	15	15	3⅛	+⅛	4 14 1
Do. 6½% Pref.	1	6½	6½	28/9	+⅛	4 10 6
Crompton Parkinson Ord.	5/–	30	24	21/3	—	5 13 0
Do. 8% Pref.	1	8	8	30/–	—	5 6 8
Edison-Swan 1st Pref.	1	7½	7½	23/3	—	6 9 6
Do. 5% Deb.	Stock	5	5	100	—	5 0 0
Electric Construction	1	Nil	Nil	8/9	—	—
Enfield Cable Ord.	1	25	25	4⅞	—⅛	5 12 7
English Electric	1	Nil	Nil	10/9	—	—
Do. do. Pref.	1	Nil	Nil	13/9	—	—
Ever Ready	5/–	35	35	29/6	+9d.	5 18 8
Ferranti Pref.	1	7	7	23/6	—6d.	5 19 2
G.E.C. Pref.	1	6½	6½	20/–	—	4 12 10
Do. ord.	1	10	8	40/9	—6d.	3 18 6
Henley's	1	30	30	6½	—	4 17 10
Do. 4½ Pref.	5	4½	4½	5½	—	4 5 9
India-Rubber	1	Nil	Nil	3/9	—	—
Johnson & Phillips	1	10	5	1⅛	—	4 4 2
Siemens Ord.	1	7½	7½	26/3	—	5 14 3
Telegraph Construction	12	Nil	Nil	10½	—¼	—

* Dividends paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

1931

9474. "Luminous electric discharge devices." British Thomson-Houston Co., Ltd., and L. J. Davies. January 27th, 1932. (381609.)

10495. "Synchronisation of a.c. electrical apparatus." General Electric Co., Ltd., R. Willoughby, and J. W. Gibson. April 9th, 1931. (381,577.)

18171. "Voltage regulators." British Electric Transformer Co., Ltd., and A. C. Whish. June 23rd, 1931. (381554.)

18278. "Vapour electric devices." British Thomson-Houston Co. June 26th, 1930. (381581.)

18441. "High-frequency thermionic amplifier." Hazeltine Corporation. July 21st, 1930. (381539.)

18456. "Low-frequency transformers." J. Poliakoff. June 26th, 1931. (381540.)

18582. "Detector devices for radio receiving apparatus." A. V. Tomlinson (Union Switch & Signal Co.). June 26th, 1931. (381555.)

18897. "Manufacture of grid electrodes for electric discharge devices." British Thomson-Houston Co., Ltd. July 1st, 1930. (381550)

18943. "Electrical cable dividing boxes and the like." W. H. Isherwood and W. H. Turner. July 1st, 1931. (381560.)

19338 "Television scanning apparatus." Marconi's Wireless Telegraph Co., Ltd., H. M. Dowsett, D. L. Plaistowe, and N. Levin. July 4th, 1931. (381544.)

19339. "Television scanning apparatus." Marconi's Wireless Telegraph Co., Ltd., H. M. Dowsett and L. E. Q. Walker. July 4th, 1931. (381545.)

19340. "Television systems and cathode-ray tubes suitable for use therein." Marconi's Wireless Telegraph Co., Ltd., H. M. Dowsett, and R. Cadzow. July 4th, 1931. (381573.)

19348. "Wireless receiving sets." C. L. P. Dean, C. W. H. Begbie, and E. C. S. Clench. July 4th, 1931. (381574.)

19683. "Wander plug and like terminals." Belling & Lee, Ltd., and E. M. Lee. July 8th, 1931. (381593.)

19691. "Electric measuring instruments." General Electric Co., Ltd., H. C. Turner, and G. R. Polgreen. July 8th, 1931. (381594.)

19744. "Automatic or semi-automatic telephone exchange systems." Standard Telephones & Cables, Ltd., J. H. E. Baker, L. P. Lowry, and E. P. G. Wright. July 9th, 1931. (381597.)

19904. "Photo-electric cells." Electric Research Products, Inc. August 11th, 1930. (381606.)

20095. "Fixing devices for electrical apparatus such as electric transformers enclosed in a container." British Thomson-Houston Co., Ltd., and W. S. Adams. July 13th, 1931. (381616.)

20247. "Electric signalling systems." General Electric Co., Ltd., and E. P. L. Westell. July 14th, 1931. (381620.)

20640. "Switching and control devices, especially for radio receiving apparatus." Six-Sixty Radio Co., Ltd., and D. P. Wheeldon. July 18th, 1931. (381628.)

21076. "Apparatus for the electrical treatment of gases." Whessoe Foundry & Engineering Co., Ltd., and A. G. Grant. July 23rd, 1931. (381631.)

21528. "Caps for electric incandescent lamps or discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. August 7th, 1930. (381637.)

21878. "Rotors for dynamo-electric machines." Akt.-Ges. Brown, Boveri et Cie. August 4th, 1930. (381641.)

22187. "Telegraph apparatus." H. A. Hill (Fuld & Co., Telephon und Telegraphenwerke Akt.-Ges.). August 5th, 1931. (381643.)

22207. "Galvanic batteries." Oldham & Son, Ltd., and H. Holt, Junr. August 5th, 1931. (381645.)

22675. "Methods of and devices for forming supporting wires for filaments of incandescent lamps and the like." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. August 13th, 1930. (381655.)

22811. "Electric contacts for switches, fuse-holders, and the like." General Electric Co., Ltd., and F. G. Quance. August 12th, 1931. (381657.)

23399. "Electrostatic condensers." C. Dannatt, N. Holt, and Associated Electrical Industries, Ltd. August 19th, 1931. (381664.)

23462. "Electrical measuring instruments." T. G. P. Healey. August 20th, 1931. (381665.)

23543. "Resistances for the electrical heating of buildings and the like." R. G. Crittall and Crittall & Co., Ltd. August 21st, 1931. (381666.)

23920. "Electric signalling systems." British Thomson-Houston Co., Ltd. August 26th, 1930. (381669.)

24218. "Polyphase rectifier installations." Akt.-Ges., Brown, Boveri et Cie. September 12th, 1930. (381674.)

24224. "Semi-automatic electrically operated filling and delivery apparatus for liquid or pasty or pulverulent products." A. Vaverka. August 28th, 1931. (Addition to 355512.) (381675.)

24588. "Electric lamps, particularly adapted to be carried or supported on the person." Oldham & Son, Ltd., and H. Holt, Junr. September 1st, 1931. (381681.)

24863. "Electric metal-vapour vessels." Akt.-Ges. Brown, Boveri et Cie. October 24th, 1930. (381685.)

25450. "Electric switch resistances." S. Ruppel. September 10th, 1930. (381689.)

25537. "Combined switches and wall connectors." C. L. Arnold and M. K. Electric, Ltd. September 11th, 1931. (Cognate application 1031/32.) (381690.)

26042. "Electrical apparatus for geophysical surveying." F. G. L. Scott. September 17th, 1931. (381695.)

26809. "Electric luminous discharge tubes." Siemens & Halske Akt.-Ges. September 25th, 1930. (381703.)

26980. "Electrical measuring instruments." General Electric Co., Ltd., H. C. Turner, and G. R. Polgreen. September 28th, 1931. (381705.)

27956. "Electrical indicating, controlling, or repeating systems." General Electric Co., Ltd., and A. A. Chubb. October 8th, 1931. (381719.)

28096. "X-ray tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. October 13th, 1930. (381720.)

28715. "Radio-electric receivers." Soc. Industrielle des Procedes W. A. Loth. October 16th, 1930. (381724.)

28852. "Frequency indicating apparatus." Everett, Edgcumbe & Co., Ltd., A. E. Drew, and R. E. Everett. October 16th, 1931. (381726.)

29719. "Electrical multiple typewriter." J. Trachtenberg. October 28th, 1931. (381733.)

29988. "Electric time switching devices." Akt.-Ges. für Schaltapparate. November 5th, 1930. (381737.)

1932

2214. "Regulation of voltage or current by means of electron tubes." Igranic Electric Co., Ltd. February 2nd, 1931. (381805.)

4745. "Telephone installations employing a plurality of exchanges." Mix & Genest Akt.-Ges. February 18th, 1931. (381818.)

4867. "Oil and temperature controlled ignition cut-out." W. D. Albertson and M. E. Moody. February 18th, 1932. (381821.)

5937. "Electric communication systems." Western Electric Co., Ltd. (Bell Telephone Laboratories Inc.). February 27th, 1932. (381831.)

6218. "Electric battery lamp." Ever Ready Co. (Gt. Britain), Ltd., and E. F. Beeston. March 1st, 1932. (381835.)

6319. "Capless electric incandescent lamps or discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. March 3rd, 1931. (381387.)

7844. "Electrical insulators." British Thomson-Houston Co., Ltd. March 17th, 1931. (381845.)

8402. "Thermionic amplifier and rectifier systems." Marconi's Wireless Telegraph Co., Ltd. March 21st, 1931. (381847.)

9674. "Receiving circuits for audio-frequency telegraphy." C. Lorenz Akt.-Ges. April 30th, 1931. (381856.)

10625. "Time controlled electric switches." J. Gunning. April 13th, 1932. (381862.)

10848. "Electric lamps." General Electric Co., Ltd. June 16th, 1931. (381866.)

10880. "Radio receivers." Marconi's Wireless Telegraph Co., Ltd. April 15th, 1931. (381868.)

11207. "Method of and means for killing animals by electricity." K. A. Weber. April 19th, 1932. (381870.)

12042. "Electric switches, more particularly for use on automobiles." R. Bosch Akt.-Ges. May 9th, 1931. (381877.)

12386. "Television and like systems." J. C. Wilson, and Baird Television, Ltd. April 29th, 1932. (381882.)

13036. "Electrical weft-feelers for looms." Soc. Anon. A. Saurer. May 22nd, 1931. (381887.)

14066. "Electrical apparatus and electrodes therefor." Siemens & Halske Akt.-Ges. July 7th, 1930. (Divided application on 373195.) (381576.)

15292. "Television and like apparatus." J. L. Baird, and Baird Television, Ltd. May 30th, 1932. (381898.)

15573. "Radio and other high-frequency receivers." Telefunken Ges. für Drahtlose Telegraphie. June 23rd, 1931. (381902.)

15969. "Electric discharge lamps." General Electric Co., Ltd. (Patent Treuhand-Ges. für Elektrische Glühlampen). June 6th, 1932. (381904.)

17305. "Intermediate-frequency thermionic amplifiers." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. June 25th, 1931. (381907.)

17669. "Electric dry batteries." E. Groove. June 22nd, 1931. (381908.)

18400. "Electrical power conversion systems." International General Electric Co., Inc. June 29th, 1931. (381910.)

21493. "Photo-electric cells and methods of making them." Electrical Research Products Inc. August 11th, 1930. (Divided application on 381606.) (381608.)

24724. "Magnet cores for use in loading-coils and the like." Automatic Electric Co., Ltd., and P. N. Roseby. July 30th, 1931. (Divided application on 21814/31.) (381916.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from October 26th :—

Supersonne. No. 526844. Class 8. Sound-reproducing apparatus, radio-telegraphic and telephonic apparatus and parts thereof.—Sparks Withington Co., Jackson, Mich., U.S.A. (British representatives: White, Langner, Stevens, Parry and Rollinson, 5-9, Quality Court, Chancery Lane, W.C.2.)

Premier. No. 529567. Class 8. Electrical resistances for use in heating and cooking, and thermostatically operated safety switches. No. 529568. Class 13. Terminals, sockets, switches, reflectors, plugs and connectors, &c. No. 529571. Class 18. Cooking stoves, fires, radiators, &c., all being electrically heated. No. 529572. Class 50. Electrical insulating materials made of synthetic resin.—Premier Electric Heaters, Ltd., Keeley Street, Birmingham.

Marconiphone. No. 529686. Class 8. Radio-telephonic receiving sets and loud speakers, all for use with broadcast reception by the public, electrical public address apparatus, apparatus for reception by the public of broadcast television, &c.—Marconiphone Co., Ltd., Hayes, Middlesex.

Era. No. 529744. Class 8. Fitted electrical switchboards.—Prentice, Ltd., Low Hall Mills, Holbeck Lane, Leeds.

Remax (lettering and design). No. 533527. Class 8. Electric cables and speedometers.—Remax, Ltd., 3-6, Alfred Place, Tottenham Court Road, W.C.1.

Audiopak. No. 534872. Class 8. Radio-telephonic apparatus, radio-gramophones, &c., and parts.—British Radiophone, Ltd., Aldwych House, Aldwych, W.C.2.

Sesu. No. 534994. Class 8. Radio-telephonic apparatus, radio-gramophones, &c., and parts.—Alfred Dunhill, 186, Campden Hill Road, W.8.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Accrington.—Housing scheme, Willows Lane, &c.; borough surveyor.

Alnwick (NORTHUMBERLAND).—Houses (20), Shilbottle; R.D.C. surveyor, Council Offices.

Ayr.—Houses (36), Nursery Lands, Castlehill Estate; E. Ecrepont, Berelands Road, Prestwick.

Bath.—Domestic science college; director of education.

Becontree (ESSEX).—Elementary school; Mother Superior, Ursuline Convent, Forest Gate, E.7.

Birkenhead.—School (350 places) and remodelling old school; Our Lady's Catholic trustees.

Birmingham.—Factory, Formans Road, Sparkhill, for J. Lucas; S. W. Smith (Bidford), Ltd., builders, Westminster Chambers, Corporation Street.

Blyth.—Estate development, off Hunter Avenue; trustees of Viscount Ridley. Houses (50); borough engineer. Alterations to Turk's Head Hotel, Newsham; J. & W. Simpson.

Bognor Regis (SUSSEX).—Houses (50); U.D.C. surveyor.

Brighton.—Church, Colbourne Avenue; Chichester diocesan trustees. Extensions to Brighton and Sussex Grammar School (£9,000); governors.

Burnley.—Estate development, Old Athletic Ground, Lower Brunshaw; Burnley Estates, Ltd. Development, Kay-Shuttleworth Estate, Cog Lane; Lord Shuttleworth.

Burslem (STAFFS).—Extensions to mills, Federation Road; Burslem Mills, Ltd. Rehousing, Massey Square; Stoke city engineer.

Catford.—Houses, Hall Park Estate; A. J. Glock, Ltd.

Chippenham (WILTS).—R.C. church; Rev. J. T. Judge, 2, Station Hill.

Chorley.—Houses (30), Blackburn Road; J. W. Lee, Ltd.

Croydon.—Additions, premises, Stafford Road; Harper Automatic Machine Co., Ltd., 56, Whitehall Road, Thornton Heath.

Doncaster.—Conversion of premises into art school (£6,900); director of education.

Dudley.—Bakery, The Belper; Reynolds & Hughes. Houses (20), Priory Estate; J. E. Strong.

Durham.—Additions to Monkton council school; F. Willey, architect, 34, Old Elvet.

Easingwold.—Houses (24) for the R.D.C.; C. W. C. Needham, architect, 29, High Ousegate, York.

East Ham.—Church, Burges Road and Watson Avenue; C. Spooner, architect, Eyot Cottage, Chiswick Mall, London. Café and store, Heigham Road; B. C. Brewster.

Edinburgh.—Houses (500), Granton Mains, for Housing Corporation of Great Britain, Ltd.

Enfield.—Factory, Great Cambridge Road; Nissen Buildings, Ltd., 87, Buckingham Palace Road, S.W. Houses (39), Goat Lane; J. Neilson. Alterations to cinema, Burleigh Way; C. A. Masey, architect, 15, Caroline Street, W.C.1. Alterations to "Nags Head" public house; Wm. Stewart, Newlyn House, 4, Aldgate, E.C.

Essex.—Extensions, Romford Institution (£325,355), for the P.A.C.; clerk, Chelmsford.

Fenton (STAFFS).—Houses (40), off Grove Road; J. B. Thompson.

Fleetwood.—Infants' school (£12,000); director of education, County Offices, Preston.

Folkestone.—Houses (32); borough surveyor.

Glasgow.—Houses, Borron Street; city architect. Office buildings for Refuge Assurance Company, Ltd.; S. Birkett, architect, 16, John Dalton Street, Manchester. Branch bank for British Linen Bank, Edinburgh; Bryden, Robertson & Boyd, architects, 278, St. Vincent Street. Offices, &c., and track for Possilpark and Springburn Greyhound Racing Co.; J. G. Aitchison, architect, 170, Hope Street. Houses (700), Paisley Road West and Cardswald (644), for Western Heritable Investment Co.; J. Wilson, architect, 141, Bath Street.

Guildford.—Church, Weston Road; Mrs. Paynter and Building Committee, 35, New Broad Street, E.C.2.

Hanley.—Houses (26), Cliffe Vale; G. H. Broad.

Hartley Wintney (HANTS).—Houses (32); R.D.C. surveyor.

Harrow.—Elementary school, Eastcote Lane (£23,355); J. Woollard & Sons, Ltd., Acton.

Hastings.—School for the managers of St. Mary Star of the Sea Catholic Schools; priest-in-charge.

High Wycombe.—Factory, Rosebery Avenue, for Bond Bros. Houses (66), Hammersley Lane, for Bentley & Gregory.

Huddersfield.—Houses (141), Wormald Street site; borough surveyor.

Hull.—Distillery for J. M. Mills, Ltd., Brookfield Distillery, Hempshaw Lane, Stockport.

Irish Free State.—(CASTLEBLANEY, Co. MONAGHAN).—Houses (26); F. Gibney, architect, 16, Westmorland Street, Dublin. (CLONES, Co. MONAGHAN).—Houses (118), Church Hill; F. Gibney, architect, 16, Westmorland Street, Dublin. (DUBLIN).—Flats (48), Greek Street and Mary's Lane; Dublin housing architect, Exchange Buildings, Lord Edward Street. (WICKLOW).—Houses (61), Rathdrum and Shillelagh areas; P. W. Sheenan, secretary to Board of Health and Public Assistance, Wicklow.

Isle of Wight.—Hospital maternity block; S. R. Cocks, R.D.C. surveyor.

Jarrow.—Houses (30), Old Church area; borough engineer.

Keighley.—Housing scheme, Woodhouse; borough engineer.

Kilmarnock.—Greyhound racing track; Ayrshire Greyhound Racing Co., Ltd.

King's Lynn.—Fruit canning factory for Beaulah, Ltd.; W. Beaulah, managing director, Boston.

Kingswinford.—Houses (28); F. Oakes, R.D.C. clerk, Wordsley, Stourbridge.

Lanarkshire.—School, Bankhead Road, King's Park; J. Stewart, master of works, 20, Albert Street, Motherwell. Houses (56), High Blantyre and Law (electrical work); P. C. Smith, architect, 13, Clydesdale Street, Hamilton.

Leigh.—Houses (330), Warrington Road; borough surveyor.

Leyland.—Senior school (£21,000); director of education, County Offices, Preston.

Liverpool.—Secondary school; Mother Superior, Sisters of Mercy, Broughton Hall, West Derby, Liverpool.

London.—(BATTERSEA).—Rebuilding Park Tavern, Battersea Park Road; S. A. S. Yeo, architect, St. Andrew's Lodge, Homefield Road, Sudbury, Middlesex. (BROCKLEY).—Tenements (48), L.C.C. Estate; Gee, Walker & Slater, Ltd., 58, Pall Mall, S.W.1. (WANDSWORTH).—Extensions to premises, Point Pleasant, Southfields, for the Aluminium Plant & Vessel Co., Ltd., Wandsworth; Wallis, Gilbert & Partners, architects, 29, Rowland Gardens, S.W.7. (SOUTHFIELDS).—Alterations to Hospital for Incurables, West Hill; Hudson Bros. (Builders), Ltd., 207, St. John's Hill, S.W.11.

Longbenton (NORTHUMBERLAND).—Houses (104), Forest Hall, for the U.D.C.; R. Carse & Sons, builders, Grey Yard, Oldgate, Morpeth.

Longley (WORCS).—Wesleyan church, Warley Road, Rood End; W. H. Giles, architect, Oldbury.

Luton (BEDS).—Factory, John Street, and 17 houses, for H. C. Janes, Ltd.

Maidenhead.—Block of service flats and restaurant, Bridge Road; the Empire Building & Trading Co.

Malden (SURREY).—Development of 200-acre estate, Coombe Hill, for houses; Messrs. Crouch.

Malpas.—Cinema; C. Ogilvie Campbell, architect, District Bank Chambers, 1, Frodsham Street, Chester.

Manchester.—Extensions to St. John's Schools, Longsight; C.O.E. managers. Houses (860), Royal Oak area, Wythenshawe; housing director, Town Hall. School, Benchill; E. Taylor & Co., Ltd., Littleborough. School, Victoria Avenue, East Estate, Blackley; W. O. Lester Smith, Education Offices, Deansgate. Reconstruction of premises, adjoining Smithfield Market (£15,000); city architect, Town Hall. Extensions to works for Chappel Brothers, Ltd., Langley Road, Ford Lane, Pendleton.

Mansfield.—Re-erection of premises (electrically equipped) for Whiteley Electrical and Radio Co., Ltd., Victoria Works, Victoria Street. Operating theatre and X-ray room (£6,225), and conversion of premises into nursing home, Mansfield & District Hospital; B. C. Westwick, architect.

Middlesbrough.—Houses (252), Grove Hill; Middlesbrough Estate Co.

Muswell Hill.—Houses (37), Halliwick Manor Estate; Lord and Mellodew, Ltd., Garden Street, Mumps, Oldham.

Newcastle-on-Tyne.—Houses (24), Welburn Estate; Cussins, Ltd., builders, Welburn Estate.

Penrith.—Houses (26), C. Edmundsen; U.D.C. surveyor, Council Offices.

Portland.—Housing scheme, Weston Street; U.D.C. surveyor.

Portsmouth.—Houses (150); borough surveyor.

Reigate.—School for the Borough E.C.; O. J. Porter, quantity surveyor.

Scarborough.—Extensions to hospital and dispensary; W. Marchment, architect, 11, Stanley House, S.W.1.

Seaham Harbour.—Houses (50), for the U.D.C.; G. Cairns and Sons, builders, Herrington Burn.

Sedgefield.—Houses (100); J. Stones, surveyor, Council Offices.

Shetlands.—Houses (80); clerk, County Council, Lerwick.

Staffordshire.—Extensions to North Staffordshire Royal Infirmary (£15,000).

Staines.—Development Yeoneney Manor Estate for Middlesex C.C.; A. E. Aston, architect, "Ashmead," Hatton Road, Cheshunt, Herts.

Stoke-on-Trent.—Houses (46), Goms Hill; McKeand, Smith and Co., Ltd., Wednesbury.

Swadlincote.—Houses (48), for the U.D.C.; G. & C. Whittle, Ltd., builders, Arnold. Bungalows (16); Thomas Barker and Sons, builders, 14, Swan Street, Loughborough.

Tunstall.—Additions to tile works for Richards Tiles, Ltd., Pinnox Works.

Tynemouth.—Houses (301), Silkeys Lane; J. L. Beckett, borough engineer, Town Hall.

Wallasey.—Clinic and dispensary, Mill Lane; borough engineer. Extensions, Oldershaw school (£9,300); Adams Bros. (Liverpool), Ltd.

Wallingford.—Houses (30), Didcot; R.D.C. surveyor.

Wealdstone (MIDDLESEX).—Houses (73), St. Paul's Avenue; T. Blade.

Weetslade (NORTHUMBERLAND).—Houses (20), Seaton Burn, for the U.D.C.; J. W. Braithewaite & Co., builders, Heaton.

Welwyn (HERTS).—Houses (20), Woolmer Green; R.D.C. surveyor.

Wembley (MIDDLESEX).—Elementary school, Oakington Manor Drive (£17,486); John Laing & Son, Ltd., Mill Hill, N.W.7.

Whitwood (YORKSHIRE).—Houses (20); F. Schofield, Council Offices, Whitwood Mere, Castleford.

Willenhall.—Re-erection of works, Lichfield Road, New Invention, for H. Squire & Sons, Ltd. (£18,000).

Willesden.—Technical school, Dudden Hill; Middlesex E.C., Victoria Street, S.W.1.

Willington (Co. DURHAM).—Houses (24); U.D.C. surveyor, Council Offices.

Wolverhampton.—Extensions, St. Peter's Collegiate School (£13,000), for E.C.

Worcestershire.—Infirmary extensions, Evesham (£8,298), for the P.A.C.; Espley & Co., Ltd., builders.

Worthing.—Offices, store and flats, Southdownview Road; H. Scott & Co., Ltd. Development, Alinora Estate; C. W. Moat and Smugglers Farm, Ltd.

Wylam-on-Tyne.—Rebuilding flour mills, for T. G. Dyke and Sons; W. Charlton and Sons, builders, Crawcrook-on-Tyne.